

The Boeing Company

Huntington Beach, CA

Administrative Final

Environmental Assessment for
Harbor Activities Associated with
the Delta IV Program at
Vandenberg Air Force Base



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Prepared for

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LIST OF ACRONYMS

AFI	Air Force Instruction
AOC	Area of Concern
APEs	Areas of Potential Effects
Bgs	below ground surface
BMP	Best Management Practices
CAAQS	California Ambient Air Quality Standard
CARB	California Air Resources Board
CBCs	Common Booster Cores
CCAFS	Cape Canaveral Air Force Station
CCC	California Coastal Commission
CCRWQCB	Central Coast Regional Water Quality Control Board
CEQ	Council on Environmental Quality
CES	Civil Engineering Squadron
CEVPC	Civil Engineering Environmental Planning Cultural Resources
CDP	Coastal Development Permit
CO	Carbon Monoxide
CSLC	California State Lands Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DBA	Decibels
DTSC	California Department of Toxic Substances Control
EA	Environmental Assessment
EELV	Evolved Expendable Launch Vehicle
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPT	Elevated Platform Transporter

LIST OF ACRONYMS (cont'd)

ER-L	Effects Range-Low
EWR	Eastern and Western Range
FEIS	Final Environmental Impact Statement
FONSI	Finding of No Significant Impacts
GIS	Geographical Information System
HIF	Horizontal Integration Facility
HPS	High-Pressure Sodium
IRP	Installation Restoration Program
Knots	nautical miles per hour
Kv	Kilovolts
M	Medium
mg/kg	milligrams per kilogram
MLLW	Mean Lower Low Water
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
ND	Not Detected
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
OSPR	Oil Spill Response Plan
PL	Public Law
PM ₁₀	Particulate Matter Less Than 10 Micrometers
ppm	parts per million
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS (cont'd)

ROD	Record of Decision
SCCAB	South Central Coast Air Basin
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLC-6	Space Launch Complex-6
SO ₂	Sulfur Dioxide
SR	State Route
SRMs	Solid Rocket Motors
SWPPP	Stormwater Pollution Prevention Plan
URL	Universal Record Locator
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
NMFS	National Marine Fisheries Service
VAFB	Vandenberg Air Force Base
VOC	Volatile Organic Compound
WET	Waste Extraction Test

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1.0 PURPOSE AND NEED FOR PROPOSED ACTION

This section describes the environmental review that has preceded this Environmental Assessment (EA), identifies the specific location of the project, establishes the purpose and need for the Proposed Action, explains the decision to be made by the U. S. Air Force (USAF), and presents the scope and organization of the EA.

1.1 Historic Environmental Review

Consistent with the requirements of the National Environmental Policy Act (NEPA) and the implementing guidelines of the Council on Environmental Quality (CEQ), as well as Air Force Instruction (AFI) 32-7061, the USAF issued a Final Environmental Impact Statement (FEIS) in April 1998 that assessed the potential environmental impacts resulting from the development, deployment, and operation of the Evolved Expendable Launch Vehicle (EELV) program at Vandenberg Air Force Base (VAFB) and Cape Canaveral Air Force Station (CCAFS) (USAF, 1998). Subsequent to the implementation of the EELV program, McDonnell-Douglas Corporation, a wholly owned subsidiary of The Boeing Company (Boeing), proposed the use of larger solid rocket motors (SRMs) for the EELV/Delta IV medium-lift vehicle (M+ configuration). In addition, Lockheed Martin Astronautics proposed the use of SRMs on its M configuration vehicle. The impacts from the use of these SRMs were evaluated in a Supplemental Environmental Impact Statement (SEIS) issued in March 2000 (USAF 2000).

Concurrent with and subsequent to the preparation of the FEIS and SEIS, Boeing continued to refine the many details that are required to carry out the EELV program. In the FEIS, Boeing proposed to transport the Common Booster Cores (CBCs) to VAFB and CCAFS via a ship, the Delta Mariner. The CBCs are the first stage for the launch vehicle. The impacts to the VAFB harbor from receiving the CBCs were evaluated briefly in the FEIS. The evaluation included the redredging necessary to remove sediments that had accumulated since 1989 when the harbor was last redredged. Six harbor-related project elements either were not included at all or not fully evaluated in the FEIS or SEIS because the details were not fully developed. These six elements include:

- Redredging of the VAFB harbor;
- Use of a temporary sediment storage area for the 2001 redredging;
- Modification of the dock to include a ramp and reconfigure the lighting;
- Refurbishment of the docking dolphins;
- Construction of and use of a turnaround area for the CBC transporter; and
- Use of the harbor for transshipping EELV related hardware.

More information is now available, and this EA evaluates the impacts of these elements.

1.2 Location of Proposed Action

The VAFB harbor is located on South VAFB roughly 2½ miles southeast of Point Arguello (**Figure 1-1**). Land access to the harbor is through the VAFB South Gate entrance via State Route (SR) 246, then over Air Force-controlled secondary roadways, including Arguello Boulevard, and Bear Creek and Coast roads. **Figure 1-2** shows the locations of the various project components in the harbor area.

Figure 1-3 is an oblique aerial photograph that shows various physical features within the harbor area, including the breakwater, the dock, and the boathouse.

1.3 Purpose and Need for the Proposed Action

As an integral facet of the EELV program, Boeing has proposed to transport the CBCs to VAFB and CCAFS on the custom-designed, river- and ocean-going vessel, the Delta Mariner. The FEIS and SEIS indicated that Boeing would use the VAFB harbor to deliver the CBCs. The USAF approved this action in the Record of Decision (ROD) signed in June 1998.

However, the VAFB harbor has not been used for this sustained level of activity since its conversion to its present configuration in the early 1980s. Since that time, sand has accumulated in the harbor, equipment has deteriorated, and harbor facilities have been modified. In addition, the design of the Delta Mariner is different from the design of the National Aeronautics and Space Administration (NASA) barge for which the wharf was built. Based on these considerations, Boeing would need to dredge the harbor, modify the dock, and refurbish and upgrade the mooring dolphins to use the VAFB harbor effectively and safely. Sediments from the dredging will be used in a variety of construction projects at and around SLC-6. Since there may be schedule conflicts between the time the harbor would be dredged and when the sediments could be reused, Boeing also expects to store the sediments in a temporary staging area.

Weather and marine conditions at Vandenberg harbor are changeable and often adverse. Therefore, it would be beneficial to limit the ship's time at the dock to as short a period as possible. This has the added benefit of minimizing environmental impacts, such as light and noise disturbance, from the operation of the ship. To facilitate that goal, Boeing plans to construct an area near the dock to temporarily stage the CBCs and allow the specialized vehicle that is used to transport the CBCs to turn around. The potential environmental impacts from the operation of the ship are discussed in Section 4.0 of this EA. In addition, the characteristics of the CBC transporter are presented in Section 1.3.5 and the construction of the turnaround is discussed in Section 2.1.5.

The FEIS provided a general discussion of the purpose of the EELV program. The purpose and need for each of the actions mentioned above, as well as the need for the operations of the Delta Mariner are presented in more detail in the following subsections.

Figure 1-1. VAFB Harbor Location

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Figure 1-2 Project Component Locations

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Figure 1-3 Aerial View of South Vandenberg Harbor

Figure 1-4 Low Tide at Dock

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1.3.1 Harbor Redredging

Since the last time it was redredged in 1988/1989, the harbor has filled with sediment to approximately the 0 foot mean lower low water (MLLW) level at the foot of the dock (**Figure 1-4**). The Delta Mariner has an absolute minimum draft of roughly 8 feet and a working minimum draft of roughly 9 feet. To accommodate the Delta Mariner, the harbor will need to be redredged to its original working depth of approximately minus 10 feet MLLW plus a 2-foot overdredge.

Boeing proposed to use the VAFB harbor because it is the only existing facility along the coast that could be used for offloading CBCs for ready transport to Space Launch Complex 6 (SLC-6), where Boeing's Delta IV rockets will be launched. As discussed more extensively in Section 1.3.6, Boeing completed a transportation study and concluded that the CBCs are too large to be feasibly transported from other harbors that could accommodate the Delta Mariner. If the redredging were not to occur, Boeing's EELV program at VAFB would either need to be radically modified or terminated.

Because the VAFB harbor is located along a very dynamic section of the California coast, sand movement is expected to cause sediments to accumulate in the harbor as soon as dredging is complete. No data are available to indicate the rate at which sand would accumulate in the harbor. However roughly 12 to 13 feet of sediment have accumulated at the foot of the dock over the past 13 years. Because Boeing will continue to use the dock for delivery of the CBCs, it is expected that maintenance redredging of the harbor will be required roughly every two to three years over the 20-year span of the EELV program.

1.3.2 Dredge Material Temporary Staging Areas

Because the harbor sediments showed some pockets of material with metal concentrations slightly elevated above background, the dredged materials will be used on shore in the various construction projects being completed at and around SLC-6, rather than be placed back in the ocean. The basis for this decision is discussed in Section 3.9. At the time of the writing of this EA, the final construction schedule had not been set. The schedule for the materials use is dependent on the construction schedule that would be put into place once the final contractors are selected for the refurbishment of SLC-6.

To minimize the time until the harbor needs to be redredged, the initial redredging will be conducted as close as possible to the date that the dock will be needed for offloading of critical hardware. At the time of the writing of this EA, the initial redredging is proposed to occur around July 2001. However, weather, construction progress, launch manifests, and other considerations all have the potential to affect this schedule.

Because neither the construction nor the dredging schedules are precisely known at this time, the dredged materials will almost certainly need to be stored until they can be used at their appropriate locations. To minimize the time required to handle the dredge sediments and thereby keep the dredging equipment in the harbor for as short a time as possible, the temporary sediment storage area needs to be as close as possible to the harbor.

1.3.3 Dock Modifications

The loading ramp at the stern of the Delta Mariner can accommodate changes between low tide and high tide of roughly five feet for a conventional flat dock. A typical spring tide at VAFB can range as much as 7 feet between an average higher high water mark to an average lower low water mark, with extreme tidal ranges as much as 8.7 feet (Wilkins Creative Printing, 1999). During much of the monthly tidal cycle, the tidal range at VAFB harbor exceeds the operational capacity of the ship for activities on a conventional flat dock.

Boeing estimated that under the current dock configuration, roughly 85 percent of the days would have a lower low tide water level that would be too low to allow the CBCs to be offloaded onto the dock. During these low tide periods, offloading activities would have to be halted. The resulting work stoppage would extend the duration of the ship's call, which is undesirable for both safety and economic reasons.

During the early planning efforts for the EELV program, Boeing undertook discussions with many resource agencies, including the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the U.S. Army Corps of Engineers (USACE), and the California Coastal Commission (CCC). The Boeing planners and the representatives of the resource agencies recognized the need for the ship to be in the VAFB harbor for as short a time as possible for the safety of the ship, humans, and the environmental resources.

The Point Arguello area is well known by mariners for rapid changes in weather and for adverse marine conditions. Under adverse weather conditions, the vessel may need to leave the harbor and wait offshore for calmer weather. Not leaving the harbor would be unsafe, both for the crew and vessel, while leaving the harbor for deep water could result in indeterminate delays and impacts to the Delta IV program, including slipped delivery schedules and possibly even delayed launches.

Being able to offload under the largest range of tidal conditions would maximize the efficiency of unloading the Delta Mariner, thereby limiting the time it would need to spend in the harbor. The increased offloading efficiencies would minimize the potential that weather problems could further extend the ship's time in the area. To improve offloading efficiency, Boeing proposes to lower the edge of the dock to form a gently sloping ramp.

The lighting system at the dock has been modified over the past few years by turning the lights on the southern poles to face the beach rather than facing the dock as originally designed and installed. The current lighting at the dock would not be sufficient for safe operation at night. To ensure that personnel and equipment are safe, the lighting on the dock needs to be returned to its original illumination capacity and configuration.

1.3.4 Mooring Dolphin Refurbishment

The six mooring dolphins in the harbor are spaced 80 to 120 feet apart (**Figure 1-5**). The dolphins are constructed of steel with the base of each anchored approximately 10 feet into the bedrock (**Figure 1-6**). The integrity of the dolphins was evaluated (McLaren, 2000), and they were found to be fundamentally sound. However, the rubber fenders on the dolphins have deteriorated or have been lost and the steel ladders and bollards have been subjected to the corrosive action of the salt air since they were installed in 1983. To return the dolphins to their proper working order, missing or damaged equipment will need to be repaired or replaced.

1.3.5 CBC Staging and EPT Turnaround Area

The dock is located roughly 2½ miles from SLC-6 and does not have sufficient area to temporarily stage the three CBCs that would be the typical cargo of the Delta Mariner. However, unloading each CBC and transporting it directly to the Horizontal Integration Facility (HIF) at SLC-6 would add as much as 15 hours to the time the Delta Mariner would be docked. To minimize the time the ship would be at the harbor and thereby minimize impacts to adjacent environmental resources, Boeing developed plans to construct a CBC staging area near the dock. The environmental resources potentially affected by the ship being in the harbor are discussed in Section 3.5.1.2.

The staging area would be used to temporarily park the first CBCs offloaded as subsequent CBCs are offloaded. This temporary staging would allow the ship to be released for a quicker departure, thereby substantially reducing the duration of ship calls.

The CBCs will be offloaded from the ship by an Elevated Platform Transporter (EPT). The EPT is a specialty transport vehicle that is roughly 130 feet in length, has nine axles, and is comprised of two platforms joined by a connecting shaft.

The EPT is highly maneuverable with all axles being able to turn 360 degrees on their own axes. This maneuverability allows the EPT the capability of turning around within its own length. The EPT can travel forward or backward along its long axis. However, having the EPT travel in reverse from SLC-6 to the harbor (or from the harbor to SLC-6) would be unsafe and would cause unnecessary wear on the EPT. To allow the EPT to turn around near the dock and thereby travel forward in each direction, Boeing developed plans to add a turning area to the CBC staging area.

Figure 1-5 Location of Mooring Dolphins and Boathouse Dock Area

Figure 1-6 VAFB Harbor Mooring Dolphins

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Because the EPT is so maneuverable, the turnaround is only slightly wider than the EPT length. When not in use, the EPT would be stored in the HIF at SLC-6.

1.3.6 Vessel Operations

The CBCs and other rocket components are manufactured and assembled at Boeing's focused factory in Alabama. Constructing the CBCs nearer to SLC-6 is infeasible given the massive size of the manufacturing facilities required for such an operation. Boeing selected a CBC design larger than previous first stages to allow use of liquid oxygen and liquid hydrogen as propellants. The use of these fuels has the benefit of minimizing exhaust emissions during launches. A consequence of this large design, however, is that Boeing's options for moving the CBCs from Alabama to VAFB are limited to a barge or a specially designed ship.

Boeing completed a transportation feasibility study to evaluate the best method to deliver the Delta IV components to VAFB and CCAFS. Certain assumptions were incorporated into the study, including that the CBCs would be produced at a single facility for use at both VAFB and CCAFS, and that they would be shipped flight ready¹. Because of the large size of the CBCs when mounted on a transport vehicle, 160 feet in length, 16.4 feet in width, and 25.4 feet in height (roughly the size of a Boeing wide-body airplane fuselage), transportation by truck or rail was infeasible.

In addition to the CBCs and other flight hardware that is proposed to be brought into the harbor during the operational phase of the EELV program, a large piece of hardware, the launch table, is required for the construction of the launch pad. It is being constructed in Vancouver, Washington, and must be delivered by barge due to its massive size. The launch table, which will be incorporated into SLC-6, weighs roughly 750 tons and measures approximately 86 feet long, 28 feet high, and 41 feet across when loaded on the transporting trailer. To achieve its required structural integrity, it is being manufactured as a single unit and shipped in one piece.

These components exceed the size restrictions for non-permitted cargo on California highways in height, width and length. The normal minimum height between pavement and lowest point on overpasses over Highway U.S. 101 is 16 feet. The length and width can be accommodated as a permitted oversized load on California highways; however, the height of the CBC with the transporter is approximately 26 feet. If off-loaded at Port Hueneme (Ventura County), the nearest roll-on roll-off capable dock, the CBC requires a transportation route through Mojave and over Tahachapi. The loaded EPT only moves 3 mph. CHP/Cal Trans will only permit the cargo for this route as long as no other alternative mode of transportation is available. Cal Trans views the

¹ Flight ready meant that there would be minimal vehicle processing at the launch sites thereby controlling and minimizing hazardous materials use at these facilities.

VAFB Harbor as a viable alternative mode. The launch table faces the same height issue. Both the launch table and the CBC are unable to transport on surface streets to avoid overpasses on Highway U.S. 101 due to low hanging wires, traffic signals, sharp turns and inclines exceeding 6 degrees. These same limitations preclude the use of Santa Barbara harbor (Santa Barbara County) or Port San Luis (San Luis Obispo County).

Similar practical size restrictions exist for rail transportation for both the CBCs and launch table. The maximum size of rail flat cars is 92 feet. To transport a CBC would require using three rail cars, and then still having a CBC hang roughly 20 feet over each end. This arrangement would leave the ends unsecured and unprotected, which is unacceptable. Adapting a cradle pallet system for rail transport requires a complete CBC redesign increasing CBC weight and decreasing payload capability. To load or unload the CBC for rail transport without the proper crane equipment and trained crews may impart structural stresses that could cause an in-flight failure. This equipment and capability is currently not available at rail spur locations. The combined height of the CBC on its cradle pallets is a limitation for rail as well as highway. Once loaded, the shunting activity of connecting rail cars would convey shock forces to the CBC that could also cause in-flight failure.

Only one U.S. aircraft, NASA's Super Guppy, is capable of holding the assembled CBCs. NASA will make the Guppy available, but only on a limited basis, as it can be scheduled between NASA cargo movements. To use the Guppy, special handling equipment would be required to secure the CBC within the cargo area which allows the cargo to be restrained against take off and landing forces in excess of 5 Gs. A more robust CBC design would be required, increasing its weight and decreasing its payload capability.

Two foreign owned aircraft, the Ukrainian Antonov and the Airbus "Beluga", were considered for transport of the CBCs. However, transport by a foreign carrier would require agreements between Delta IV customers and these carriers. Dictating agreements between Boeing and foreign companies was beyond the scope of this EA. Furthermore, the Antonov lacks the financial support required for the necessary supply support system within the U.S. required to maintain reliability. As a consequence the use of airplanes for the routine transport of the CBCs is considered not feasible.

For the reasons stated above, Boeing must transport the CBCs by barge or specially designed vessel, and has selected the specially designed Delta Mariner for use. Because of the length of Boeing's transportation study, it has not been included as an appendix to this EA. However, copies can be reviewed at the Environmental Management office at VAFB, or can be supplied to interested parties upon request to the environmental coordinator of the EELV program at Boeing.

1.4 Decision to be Made

The USAF has entered into leasing and licensing agreements with Boeing for Boeing's use of facilities on VAFB and CCAFS for the EELV program. The USAF complied with its obligations under NEPA to evaluate potential environmental impacts of the EELV program when the FEIS was published and the associated ROD signed in 1998, and the SEIS and associated ROD were published and signed in 2000.

As the EELV program goes forward, both Boeing and the USAF, on behalf of Boeing, will need to apply for permits from federal and California agencies with jurisdiction over projects at VAFB. Because the FEIS was published before some of the project details were known, the detailed analysis of the impacts from these actions was deferred until this information became available. Now that many of the pertinent details are available, this EA has been prepared on behalf of the USAF. The decision to be made by the USAF is whether or not to grant approval of the proposed actions described in this EA. Based on the information provided in this EA, the USAF will decide whether a Finding of No Significant Impact (FONSI) can be issued or if an Environmental Impact Statement (EIS) is required.

1.5 Scope of the Environmental Assessment

This EA has been prepared to provide additional information on six specific aspects of Boeing's EELV program, identified in Section 1.1, all of which are associated with the VAFB harbor. It follows both an FEIS and SEIS prepared by the USAF specifically in support of the EELV program. The FEIS and SEIS provided a comprehensive analysis of the program in general and described background information in support of much of the analysis presented in this EA. Because both the FEIS and SEIS serve as the basis for this EA and they are referred to extensively, citations for them are not included following each reference. All references to the FEIS and SEIS in this document are to the *Final Environmental Impact Statement, Evolved Expendable Launch Vehicle Program, USAF, 1998* and the *Supplemental Environmental Impact Statement, Evolved Expendable Launch Vehicle Program, USAF, 2000*, respectively.

In accordance with AFI 32-7061 and CEQ regulations, potential environmental impacts are discussed in proportion to their significance. The level of analysis was determined by the amount of information that would be required for the decision-makers to make an informed choice. Consequently, different levels of detail are presented for the resource areas in this EA.

This EA is organized into eight sections. Section 1.0 discusses the background and basis for the EA. Section 2.0 presents the Proposed Action and alternatives, while Section 3.0 describes the potentially affected environment. Section 4.0 evaluates the potential impacts from the project elements, and Section 5.0 expands the evaluation to consider cumulative impacts that could result

from the project when considered in conjunction with other projects. Section 6.0 presents the literature used to prepare the EA. Section 7.0 presents the agencies, organizations, and persons contacted. Section 8.0 presents the personnel who prepared the EA.

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2.0 PROPOSED ACTION AND ALTERNATIVES

Boeing has developed details of the six project elements at, or associated with, activities at the harbor. Alternatives to each element have been considered and, when feasible, are included in this section. Where no feasible alternatives have been identified, the reasons that none exist are discussed. For all six-project elements, the "No Action" alternative is described.

2.1 Proposed Action and Alternatives

Boeing proposes to transport the CBCs via the ship Delta Mariner from Boeing's focused factory in Alabama to VAFB, and to transport the SLC-6 launch table from the manufacturer in Washington to VAFB. To do this, the harbor located on South VAFB (also referred to historically as the Boathouse Harbor) must be redredged and the docking facilities refurbished and upgraded. In support of the redredging, Boeing proposes to store the dredged material temporarily in a staging area near the dock. In addition, Boeing plans to construct a separate area near the dock to serve as a temporary staging area for the CBCs during ship offloading and to provide maneuvering room for the EPT that transports the CBCs to SLC-6. The following sections describe each of the six project elements in support of the EELV program at SLC-6.

2.1.1 Harbor Redredging

The proposed harbor redredging, No Action alternative, and alternative redredging methods are described in the following subsections.

2.1.1.1 Proposed Action

To accommodate the Delta Mariner and the barge delivering the launch table, the sand that has accumulated in the harbor since its last redredging in 1989 must be removed (**Figure 2-1**). The FEIS discussed the need to remove roughly 20,000 cubic yards of material from the harbor. However, based on historic records and recent bathymetric surveys, approximately 15,000 cubic yards of sediment need to be removed from the harbor channel and vessel maneuvering area.

Redredging would be accomplished to the previously dredged depth of approximately 10 feet below MLLW (mean lower low water) plus a 2-foot overdredge. Redredging to this depth would be to bedrock. Dredged material would ultimately be placed in upland sites as backfill or road-base material for various Boeing EELV construction projects, including construction of the EPT turnaround. Redredging would be conducted in accordance with the requirements of a lease of state lands from the California State Lands

Figure 2-1 Extent of Harbor Redredging

Commission (CSLC) and a Section 10² dredging permit issued by the USACE. Because the lease and dredge permit had not been issued at the time of the writing of the EA, detailed lease and permit conditions were unknown. However, Boeing anticipates that the actions described and mitigation measures identified in this EA will be the basis for these lease and permit conditions.

Prior to the initiation of both the initial redredging and subsequent maintenance dredging, the dredging contractor will prepare a detailed Dredging Execution Plan that describes the actions to be completed, the schedule for completion, safety precautions, spill contingencies, mitigation measures, a list of contacts, and delineation of responsibilities. This Dredging Execution Plan will be reviewed and approved by VAFB, CSLC, and CCC environmental staffs prior to the commencement of dredging. The Dredging Execution Plan will also include the sediment handling and dewatering activities described in the following paragraphs.

Sediment would be removed from the harbor using a clamshell dredge. A crane would be placed on the dock and it would collect sediments that are within reach from the dock. The crane would put the excavated sediments directly into a bermed temporary sediment dewatering area on the dock, where excess water would drain from the sediments and be captured in the bermed area. The walls of the dewatering area would be formed with K-Rails, which are prefabricated concrete retaining structures that can be easily transported to sites and lowered into place with a crane. The K-Rails would be transported to the dock and set on the dock surface to form a rectangular holding area. K-Rails are approximately 3 feet tall and would be used to form a dewatering area that is approximately 60 feet wide and 120 feet long. Plastic sheeting would be placed on the floor of the area and extended over the K-Rails in order to retain water within the dewatering area. The dewatering area will be adequate to retain a heavy rainfall event during the dredging.

It is anticipated that roughly one-third of the dock would be used for dewatering the sediment and the holding tank. Maneuvering areas for the crane and other equipment would occupy the rest of the dock area during the dredging.

To dredge the sediments that are situated too far from the dock to be reached by the dockside crane, a crane would be placed onto a small barge. A small tugboat or a tender would be used to move the barge about the harbor in order to dredge the remaining material. The sediment would be scooped up and placed into a materials barge. As soon as it is full, the tug would move the materials barge to the dock, where the sediment would be transferred to the bermed area. Sediment would be transferred from the materials barge to the bermed area using the dockside crane, or by using the crane/clamshell bucket on the dredging barge.

² Section 10 of the Rivers and Harbors Act

Inside the dewatering area, suspended material would settle out and the water would accumulate until it spilled into a stand pipe that leads to a sump. From the sump, the water would be pumped into a temporary holding tank (e.g., 20,000-gallon Baker™ Tank) and samples of the water would be collected and analyzed by an off-base laboratory. If the water meets the Ocean Plan screening criteria (SWRCB, 1997), the water in the holding tank would be discharged back into the harbor via a temporary pipeline laid on the ground surface and extending from the tank to the waters of the harbor. If the water does not meet the Water Quality Objectives, then the water would be transported off base to an appropriate facility for disposal. If necessary, the water would be filtered using a geo-filter or similar material to remove particulate matter from the water before the water is transferred into the holding tank. Per the suggestion of Mike Higgins (Higgins, 2001) of the Central Coast Regional Water Quality Control Board (CCRWQCB), testing of the water will occur as soon as the first sediments begin dewatering and will continue weekly thereafter until the dredging is complete.

To ensure the water quality in the harbor is protected, Boeing will develop a dredging and dredged-sediment handling Water Quality Management Plan (WQMP) for review and approval by the VAFB, CSLC, and CCC environmental staffs. This WQMP will describe the methods by which water quality will be protected, e.g., the use of a turbidity curtain and the methods for collecting, holding, testing, and discharging or otherwise disposing of the interstitial water resulting from dewatering activities. It will also describe the standards that water discharged back to the harbor must achieve, both for chemical constituents of concern and for turbidity. A draft WQMP is included in **Appendix C**.

Most of the dredged sediments consist of fine-grained sand (ENSR, 2000a). As a result, it is anticipated that water would drain from the sediments readily, likely within 2 to 3 hours (Leue, 2000). After the water has drained from the sediments, the sediments would be transported from the bermed area to the temporary staging area. It is estimated that no more than 1,000 to 1,500 cubic yards of sediment would be on the dock at one time. If sediment is left in the dewatering area over a weekend, the sediment pile may need to be sprayed as a dust control measure. Dust control measures similar to those described in Section 2.1.2.1 and 4.2.1 would be employed. Sediments would be transferred from the bermed area to the temporary staging area using dump trucks or roll-off bins that are filled by a skip loader or similar piece of equipment. The general location and size of the sediment dewatering area on the dock and the sediment staging area are shown in **Figures 2-2 and 2-3**. The temporary staging area is discussed in Section 2.1.2.

Figure 2-2 Sediment Dewatering Area

Figure 2-3 Sediment Staging Area Location Map

The dock is constructed of fill and concrete on a bedrock base. The eastern face of the dock consists of a 3-foot-thick reinforced concrete wall that is set on undisturbed bedrock. The northern and southern side-walls consist of reinforced concrete walls that are 2-foot-thick at the base and narrow to approximately 1½-foot-thick at the top. Based on a design analysis of the dock (USACE, 1981), the additional weight from sediment dewatering activities is not expected to affect the structural integrity of the dock.

Redredging would proceed at a rate of approximately 2,000 cubic yards per day. Based on the removal of up to 15,000 cubic yards of sediment, it should take roughly a week to complete the redredging itself, although three weeks have been scheduled to allow for weather or other delays. Prior to the onset of redredging, it would take approximately one week to set up equipment, construct the bermed areas on the dock, and prepare the temporary sediment storage area to receive the dewatered sediment. After redredging has been completed, another week would be required to break down equipment, dismantle the berm, and remove equipment from the harbor area. Initial redredging activities would occur 24 hours per day in order to complete the dredging as quickly as feasible. To avoid startling wildlife, the existing light fixtures on the dock would be turned on well before dusk³ to illuminate the dock area. In addition, the dredge itself would have lighting sufficient for night-time operations.

Dredging activities from the dockside would involve approximately four to eight persons. Once dredging from the barge begins, the tug and barge would be staffed by approximately four crewmembers. Approximately four support personnel working on the dock (loader operators, drivers, etc.) would also be required. The average number of vehicles traveling to the dock during dredging activities is estimated to be eight vehicles per day.

Because sand is constantly moving along the California coast, sediment will begin accumulating in the harbor soon after the redredging is completed. Sand has accumulated at the average rate of about 1-foot per year since the last redredging in 1988/89. Given the minimum draft of the Delta Mariner of 8 feet, a maximum dredge depth of 12 feet (including both the required dredge depth of 10 feet and the 2-foot over dredge), and an average sedimentation rate of one-foot per year, maintenance redredging would likely be required every two to three years. Depending upon winter storms, sediment loads of the long shore currents, and local conditions, maintenance redredging may be required more or less frequently.

Maintenance redredging would be accomplished in the same fashion as discussed above, although dewatered dredge spoils would not be stored at the temporary sediment storage area discussed in Section 2.1.2. Rather, they would be transported off site to an approved facility.

³ Dusk is defined as ½ hour after sunset; dawn is defined as ½ hour before sunrise.

Maintenance dredging is expected every two to three years covering the same area as the initial dredging and using similar equipment. An estimated 3,000 cubic yards of sediments will require removal, which will take approximately 2 ½ weeks (including one week each for mobilization and demobilization.) Prior to the maintenance dredging, sediments will be tested for metals. Based on those results and discussions with the CCRWQCB appropriate water quality monitoring will be undertaken and applicable aspects of the WQMP will be implemented.

2.1.1.2 No Action Alternative

The No Action alternative would mean that dredging of the harbor would not occur. If the harbor is not dredged, Boeing's EELV program at VAFB would be jeopardized. Where possible, Delta IV launches might be redirected to CCAFS, or the payloads might be put on other launch vehicles at VAFB or elsewhere. However, the impacts of these consequential actions have not been included in this EA because the redirection to other launch vehicles at VAFB or CCAFS was evaluated in the FEIS, while redirection to other launch sites would be highly speculative.

2.1.1.3 Alternative Dredge Method

An alternative method is the use of a suction dredge to remove the sediments. This method would involve a barge-mounted suction dredge fitted with a rotating cutter head. The cutter head would be connected to the barge through a steel arm that can pivot up and down to adjust the depth of dredging. As the cutter head churns through the sediment, water pumps on the barge would suck up a slurry of sediment and water and pump the sediment/water mixture to the dock via a floating pipeline.

The sediment/water mixture would be discharged into a series of temporary settling ponds located on the dock. The settling ponds would be lined with plastic and bermed to retain the sediment/water slurry. Sediment would settle to the bottom of the ponds and the seawater would be allowed to run into a sump at the end of the pond. Seawater collected in the sump would be discharged back into the harbor via a temporary pipeline that would run from the settling bins to the edge of the dock and back into the harbor. The bermed dewatering area would occupy most of the dock area (roughly 75 feet by 210 feet), with the remaining dock area left open for equipment/vehicle maneuvering room.

Once one cell of the settling pond is filled, the discharge hose would be shifted to a second cell and the remaining freestanding water allowed to drain to the sump. After most of the water has drained away, a front-end loader would transfer sediment from the first pond to 20-yard roll-off bins for final dewatering. The final dewatering area would be set up adjacent to the settling ponds. The dewatering area would be plastic lined, slightly sloped, and bermed. Water collected from the holding area would be pumped back into the harbor through the temporary pipeline.

After the sediment has dewatered, the roll-off bins would be put onto trucks and transported to the temporary staging area discussed in Section 2.1.2. The suction method of dredging would take up to five weeks including setup and tear down.

2.1.1.4 Alternatives Considered but Rejected as Infeasible

As discussed in Section 1.3.6, Boeing conducted a transportation feasibility study for the manufacture and transportation of the Delta IV rockets from the focused factory in Decatur, Alabama. Given the size of the CBCs and the limitations on methods to transport these components either by rail or truck, the use of alternative harbors for offloading the CBCs was judged to be infeasible. Including the transport vehicle, the CBCs are 160 feet long, 16.4 feet wide, and 25.4 feet high. Restrictions on vehicle/cargo length would prevent Boeing from routinely moving the CBCs from potential ports such as at Port Hueneme (Ventura County), Santa Barbara (Santa Barbara County), or Port San Luis (San Luis Obispo County). Based on these considerations, the use of an alternate port was deemed to be infeasible.

Dredging of the harbor to its originally designed depth of 10 feet MLLW (plus a 2-foot overdredge) would allow the Delta Mariner only a small distance from the hull to the harbor bottom during low tide on a spring tide. During conversations with the USACE, it was suggested that the harbor be dredged to a greater depth. However, to do so would require not only removing the existing sand but also blasting out the underlying bedrock. This alternative was judged to be infeasible, given that the ship can function in the original maximum harbor depth, and recognizing the major environmental disturbance that would result from such an effort.

Dredging to a shallower level or only dredging part of the originally dredged area would increase the frequency of dredging and could put the ship, tug, and personnel at a greater risk from running aground. This alternative was also judged to be infeasible.

2.1.2 Temporary Sediment Staging Area

As noted in Section 2.1.1, the dredged sediments would be taken from the dewatering area on the dock to a temporary storage location. Approximately 15,000 cubic yards of sediment would be removed from the harbor and stored at a temporary staging area until it could be used as base material or backfill material for Boeing EELV roadway improvements and construction, on an as-needed basis.

2.1.2.1 Proposed Action

A site near the harbor has been identified that would meet the requirements as a suitable temporary sediment storage area and would avoid impacts to archaeological and biological resources. The site was selected based on a review of archaeological resources of the flat areas

above the harbor (**Figure 1-2**). The site is an extended oblong area and covers approximately 4.5 acres. Preparation of the site and transportation of the sediments will be addressed in the Dredging Execution Plan mentioned in Section 2.1.1.1.

Prior to use, the site would be mowed and geofabric would be laid down to protect potential cultural resources. In addition a silt fence would be erected on the down-slope side of the storage area to retain sediments and runoff within the staging area. Following dewatering on the dock, the sediments would be loaded into dump trucks or roll-off bins for transport to the temporary storage area.

As Boeing's EELV project calls for the use of fill material, the sediments would be placed in dump trucks or roll-off bins by a skip loader and transported to the appropriate area. Depending on the specific needs of the construction, the sediments would be used for road base or other construction fill. The material would be removed from the temporary storage area within six months of the dredging.

The sediment has been tested for its suitability for use as construction fill. Because it is well-sorted fine sand containing little or no clay particles, it would make a suitable construction base material, although it may need to be mixed with other materials depending upon its final application. A detailed chemical and physical analysis of the sediment is presented in **Appendix B**.

If there is no place for the sediment to be used in the EELV program at SLC-6 because of scheduling conflicts or other problems, the sediments would be transported off the Base for use in an appropriate location as clean fill, or disposed of in an approved disposal facility.

If the sediments were to become dry and dust formation occurs, the sediment stockpile would be sprayed with a chemical binding agent such as calcium lignosulfonate⁴ for dust control. The Material Safety Data Sheet (MSDS) for calcium lignosulfonate is attached as **Appendix A**. According to the "California Stormwater Best Management Practice Handbook" (BMPESC21 - Dust Control), the application of calcium lignosulfonate is an effective chemical dust control measure.

When the site is no longer needed for sediment storage, as much of the sediment would be removed as is reasonable, the silt fence and geofabric would be removed, and the ground would be lightly tilled to several inches in order to encourage new vegetation growth. The site would be planted with seeds collected from plants growing in the adjacent areas. To ensure successful

⁴ Calcium lignosulfonate is a biodegradable, nontoxic agent that is used for dust control. It is sufficiently non-toxic that it is approved for use as a supplement to animal feed.

revegetation, a specific revegetation plan would be implemented. A draft revegetation plan is provided in **Appendix C**. Prior to implementation of the revegetation plan, the plan will be reviewed by VAFB, CSLC, and CCC botanists, revised by Boeing, and agreed to by all parties.

To avoid impacts to the area from cattle grazing, a fence would be erected around the area and would remain in place until vegetation of the area had been reestablished.

2.1.2.2 No Action Alternative

Under the No Action alternative, sediments would not be stored in a temporary staging area. This action would require that the sediments be placed directly into the areas where they would ultimately be used. Because the specific areas where the sediments would be used is dependent upon the construction activities that are concurrent with the dredging, none of these area specific areas where the sediment would be used can be identified at this time. If no construction areas were available, the sediments would be transported off-base for disposal as clean fill or in an approved disposal facility.

2.1.2.3 Alternatives Considered But Rejected As Infeasible

Two alternate temporary storage areas were proposed: the area directly across the road from the EPT turnaround area and the lower parking lot at SLC-6. The land across from the EPT turnaround contains a variety of archaeological resources. The content or lateral extent of these resources has not been fully characterized. To avoid the potential for disturbing these resources, the use of this site was rejected as infeasible. The lower parking lot adjacent to SLC-6 is being used by the Air Force for other purposes and therefore is not available to Boeing.

2.1.3 Dock Modifications

To allow the Delta Mariner to offload its cargo under a wider range of tidal conditions, the dock needs to be modified. The proposed modifications include lowering the edge of the dock to form a gently sloped ramp and upgrading the existing lighting. These two dock modifications are described below.

2.1.3.1 Proposed Action

The dock is an earth-filled concrete and asphalt structure that is approximately 100 feet wide and 240 feet long; 40 feet of the dock extends from the shoreline into the harbor. The remaining portion of the dock rests on bedrock and is used primarily as a parking area. Approximately 10 feet of the seaward portion of the dock would be modified to incorporate a ramp that would replace the existing surface with new concrete. The new surface would slope gently towards the harbor leaving the edge of the dock approximately 7½ inches lower than the original surface. The

ramp would provide a wider range of tidal conditions under which the Delta Mariner could load and unload cargo. Increased efficiency would allow for shorter ship calls.

Modification activities to the dock include the following elements:

- Saw cut and remove the existing surface of the dock, starting from the seaward edge of the dock towards the shore for approximately 10 feet,
- Repatching of concrete,
- Construction of subgrade, setting of reinforcing steel, and placing of new concrete foundation and surface,
- Installing stainless steel rub rails perpendicular to the edge of the dock,
- Repairing, refurbishing, or replacing the asphalt over the inland portion of the dock, as needed, and
- Installing a new, removable, rust and saltwater corrosion-resistant handrail at the end of the dock.

Demolition/construction activities to modify the dock would affect approximately the final 10 feet of the dock (**Figure 2-4**). To prevent debris from getting into the harbor waters, the construction contractor would pull material away from the dock face as it is loosened. In addition, a fabric net will be placed at the edge of the dock to catch debris knocked off the dock. Debris from the dock would be stored temporarily toward the middle of the dock, well away from the water. A sediment retention curtain (turbidity curtain) would be placed in front of the dock to minimize the spread of turbidity. When completed, the dock profile would consist of a 6-degree downward slope leading toward the water, starting approximately 122 inches from the edge of the dock.

In addition to modifying the dock, new light fixtures would be added to three of the existing light poles (**Figure 2-5**). There are six existing light poles at the dock, three along each side. Two 1,000-watt, energy efficient high-pressure sodium (HPS) floodlights are currently mounted to each light pole. When the light fixtures were originally installed, each light fixture was positioned to illuminate the dock. Subsequently, the USAF repositioned the lamps on the three light poles along the south side of the dock in order to illuminate the adjacent beach. Two floodlight fixtures would be added to each of the three light poles to illuminate the dock area as it was before the light fixtures were turned around. The new light fixtures would contain 1,000-watt HPS flood lamps and would match existing light fixtures in appearance. The lights facing the beach would not be relocated; however, a separate light switch would be added so that the lights facing the beach could be operated independently from those directed toward the dock.

Figure 2-4 Dock Modification Plan

Figure 2-5 Dock Lighting Modifications

Prior to undertaking the above actions, the contractor will prepare a detailed Construction Execution Plan that describes the actions to be completed, the schedule for completion, safety precautions, spill contingencies, a list of contacts, and delineation of responsibilities. This Construction Execution Plan will be reviewed and approved by VAFB, CSLC, and CCC staff prior to commencement of construction. The dock modifications would be completed in 2-3 weeks.

2.1.3.2 No Action Alternative

The No Action alternative would include no modifications to the dock and no new lighting in the dock area.

2.1.4 Mooring Dolphin Refurbishment

The mooring dolphins would need to be refurbished to allow for safe docking of the vessel.

2.1.4.1 . Proposed Action

Based on the recent dock and dolphin integrity study (McLaren, 2000), replacement of the dolphins themselves would not be required. Refurbishment of the dolphins would require the repair or replacement of the rubber fenders surrounding the dolphins, repair or replacement of the steel ladders attached to the side of each dolphin, and repair or replacement of the bollards bolted to the top of the dolphins. Refurbishment would be performed using a barge-mounted crane after dredging has been completed. The fixtures that are missing or deemed unsafe would be removed and replaced by new equipment. Refurbishment activities would take up to 15 days, during which the barge could operate up to 12 hours per day, 5 days per week. Dolphin refurbishment activities will not be conducted at night when lights would be required.

Prior to undertaking the above actions, the contractor will prepare a detailed Construction Execution Plan that describes the actions to be completed, the schedule for completion, safety precautions, spill contingencies, mitigation measures, a list of contacts, and delineation of responsibilities. This Construction Execution Plan will be reviewed and approved by VAFB, CSLC, and CCC staff prior to commencement of construction. Dock modifications will be accomplished in two to three weeks.

2.1.4.2 No Action Alternative

Under the No Action alternative, the docking dolphins would not be refurbished.

2.1.5 EPT Turnaround Area

To minimize the time the Delta Mariner would be in the harbor, Boeing proposes to construct an EPT turnaround and CBC staging area.

2.1.5.1 Proposed Action

An EPT turnaround and CBC staging area (hereafter referred to as the EPT turnaround area) would be constructed on vacant land, approximately 1,000 feet west of the harbor dock and adjacent to the V-33 Tow Road, as shown on **Figure 2-6**.

Construction of the EPT turnaround would involve the following elements:

- Burying and realigning the telephone line and 12.47 kilovolt (Kv) power line currently crossing the site,
- Clearing and grubbing vegetation from the construction area,
- Excavating, filling, and constructing the sub-grade,
- Installing the pavement,
- Installing a new lighting system along the north side of the EPT turnaround, and
- Connecting power lines associated with the light fixtures and electrical power receptacles to the existing power supply under the subbase.

The construction of the EPT turnaround area will take eight weeks.

The turnaround area would measure approximately 60 feet wide by 450 feet long. A turning circle is incorporated into the design in order to allow the EPT to turn around safely without hitting the parked CBCs. The EPT turnaround area would be paved in order to support the combined weight of the CBCs while they are staged there. Each CBC is over 16 feet in diameter, roughly 160 feet long, and weighs 34 tons. The CBCs are designed to carry liquid oxygen and liquid hydrogen as fuel. However, the fuel tanks on the CBCs would be empty while they are on the ship, and while they are being transported from the harbor to SLC-6. The CBCs would have ordnance attached at the factory; however, they would not be armed, and thus could not explode under normal conditions⁵.

The new lighting fixtures would be constructed of pre-cast concrete colored or painted, as necessary, to be a neutral, light beige or gray color to blend in with the surrounding colors. Lighting would be provided by two 400 watt, energy-efficient HPS lamps mounted on each of seven poles at the perimeter of the site. Lighting levels would be sufficient to illuminate the entire

⁵ Ordnance installed in the CBCs have a hazard class of 1.4, which does not require a safety area designated around the equipment.

Figure 2-6 Planned EPT Turnaround Area

turnaround/staging area to allow the EPT to maneuver safely at night. The relocation of the utility lines would be coordinated with VAFB Civil Engineering.

2.1.5.2 No Action Alternative

Under the No Action alternative, the EPT turnaround area would not be built.

2.1.6 Vessel Operations in the VAFB Harbor

The Delta Mariner would enter the harbor up to six times per year to offload CBCs. The proposed operations of the ship are presented below. In addition, Boeing anticipates having one barge enter the harbor during the summer of 2001 to deliver the launch table for SLC-6. The use of this barge is also presented below.

2.1.6.1 Proposed Action

The Delta Mariner is a self-propelled ship that is 292 feet long, 75 feet wide, with a minimum loaded draft of 8 feet. It has twin fully rotating stern thrusters that allow for maximum control of the stern. It also has two bow thrusters that further enhance its maneuverability. As necessary, the ship can move forward, backward, sideways, or can turn around within its own length.

The Delta Mariner would approach the harbor from the south, from the open sea to the harbor breakwater. As the vessel approaches to within three miles of the harbor, the engine speed would be reduced to slow the advance of the ship. As the ship closes to approximately one mile, it would be turned around so that it enters the harbor stern first. The ship would tie up to the dock and mooring dolphins with the stern facing the dock. The vessel's speed would average 5 knots (nautical miles per hour) from the 3-mile line to the harbor and then it would slow to less than one knot as it approaches the dock. From the time the Delta Mariner crosses the 3-mile boundary, it would take approximately 90 to 120 minutes for the ship to tie up at the dock.

The Delta Mariner would typically enter and exit the harbor during daylight hours. If the schedule calls for an early morning delivery, such that predawn activities are required, lights will be turned on before dusk the night before and left on all night. This lighting arrangement is based on discussions with the USFWS and is intended to minimize startle effects to the local wildlife (Carranza 2001).

During the first few times the Delta Mariner enters the VAFB harbor, a tugboat would escort it for an added measure of safety. However, because the vessel has both stern and bow thrusters and is highly maneuverable, a tug should be unnecessary for regular operations. After the first year of operation, the vessel owner, Foss, anticipates that the ship's crew would become accustomed to

maneuvering the ship in the harbor without assistance, so that tugboats would no longer be necessary.⁶

Once docked, unloading activities would occur 24 hours per day until the ship's cargo is completely unloaded. It would take up to 48 hours to offload the ship. If adverse weather or rough ocean conditions arise while the vessel is docked, conditions may be too unstable to offload cargo. Under these conditions, the Delta Mariner would head out to sea beyond the 3-mile limit to wait out the adverse conditions. When stable weather/oceanic conditions return, the Delta Mariner would return to the harbor to offload the remainder of the cargo⁷.

Current plans call for ship calls at a maximum rate of six per year, with fewer calls expected in the first few years. Even if the Delta Mariner were dedicated solely to transporting CBCs to VAFB, it could visit the harbor a maximum of seven times per year because the projected roundtrip from Decatur, Alabama to VAFB takes approximately 50 days.

The Delta Mariner would have a crew of from 12 to 20 persons. While the vessel is docked, the crew is restricted by contract requirements to not travel beyond the vicinity of the harbor except to visit SLC-6 or to leave South VAFB. The average number of vehicles traveling to the dock while the vessel is docked is estimated to be 12 vehicles per day, with most of the traffic occurring prior to docking and after the vessel departs.

Boeing also requires the use of the harbor for a one-time delivery of the launch table for SLC-6. The barge to be used is 220 feet long and 60 feet wide, somewhat smaller than the NASA barge for which the dock and dolphins were originally designed. The barge would be towed by two ocean-going tugs that would remain in the harbor only long enough to deliver and remove the barge. Unloading of the launch table from the barge is expected to take no more than two days. The barge would be brought in during the morning and unloading would likely stretch into the night. Lights on the dock and barge would be illuminated prior to dusk and not shut down until all activities are completed.

6 In training runs and maneuverability assessments performed in 2000, Foss demonstrated that the Delta Mariner was able to turn within its own length at the slow speeds used during a harbor approach. This maneuverability far exceeds that which is typically associated with a ship this size. Furthermore, as the crew gains familiarity with both the maneuverability of the vessel and the weather conditions and hazards of the harbor at VAFB, Foss anticipates that the continuing use of standby tugs would be unnecessary.

7 Precise descriptions of conditions under which docking and unloading may occur cannot be made until the vessel has visited the harbor and its actual handling characteristics have been ascertained. The vessel master would be responsible to make the decision to stay or leave based on the local conditions prevailing at the time. Factors that would be included in making the decision would include the rate and magnitude of weather change, the likely remaining duration of loading/offloading, and the current conditions, among others.

2.1.6.2 No Action Alternative

The No Action alternative would eliminate having the Delta Mariner transport the CBCs to VAFB. If the Delta Mariner cannot operate in the harbor, Boeing's EELV program at VAFB would be jeopardized. Where possible, Delta IV launches might be redirected to CCAFS or the payloads might be put on other launch vehicles at VAFB or elsewhere. However, the impacts of such redirection were either evaluated in the FEIS or would be highly speculative, and are therefore not included in this section.

2.1.6.3 Alternative Operational Schedule

Unloading of cargo is proposed to occur on a 24-hour basis when the ship is at VAFB. An alternative to this schedule would call for offloading and related activities to occur only during daylight hours. Actions associated with the offloading would be the same as discussed in Section 2.1.6.1, except that the ship would need to stay at the dock for additional days. It is unlikely that offloading could be completed within one daylight period, especially during the shorter daylight hours of the winter months.

2.2 Permits Required for Proposed Action

The following permits are required for this project:

- Section 10 permit from the USACE⁸ for the dredging
- General NPDES permit with low threat discharges to water quality (CCRWQCB)
- General NPDES permit for discharge of storm water⁹

The Air Force will need to secure a lease of state lands for dredging, dolphin modification, and dock modification from the CSLC. The Air Force has submitted a Consistency Determination to the CCC for the dredging, dredge-related activities, and vessel operations.

In addition, the Air Force requires approval from the following agencies prior to undertaking these activities.

- USFWS (Section 7 Consultation)
- NMFS (Section 7, Marine Mammal Protection Act, and Essential Fish Habitat Consultation)

⁸ A Section 404 permit is not required from the USACE since the dredged sediments will be disposed onshore. Similarly, a Section 401 (Water Quality Certification) would not be required from the Regional Water Quality Control Board because a Section 404 permit is not required.

⁹ This permit requires only that a Notice of Intent be filed and a Storm Water Pollution Prevention Plan be prepared and available for review.

- State Historic Preservation Officer (SHPO) (Section 106 Consultation).

Because permits and approvals are still in progress, it is impossible to discuss specific permit requirements in detail. However, Boeing assumes that the mitigation measures presented in this EA, many of which are based on interaction with the applicable agencies during EA preparation and review, will be the basis for eventual permit conditions. Execution Plans for dredging and other construction activities will be submitted for agency review and approval as will operational phase plans dealing with issues such as spill response, stormwater pollution prevention, and revegetation.

Boeing will also require an approved 30 SW Form 35 Civil Engineer Work Request from VAFB.

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3.0 AFFECTED ENVIRONMENT

This section describes the existing environment at VAFB, with a particular focus on the VAFB harbor. This information serves as a baseline from which to identify and evaluate environmental changes resulting from the proposed activities at the harbor as part of the Delta IV Program. The FEIS and the SEIS provide a comprehensive overview of the environmental conditions for the EELV program in general. New or more focused information on the affected environment for each issue area is presented in the following sections.

3.1 Land Use

Land use for VAFB and the surrounding areas is described in general in Section 3.3 of the FEIS and updated in Section 3.3 of the SEIS. The majority of South VAFB is undeveloped; the developed portion includes launch complexes, test/launch facilities, technical support areas, several mountaintop tracking stations, and a 150-acre administrative/industrial area. Some of the undeveloped areas on South VAFB are leased for grazing.

In the harbor area, land use on the flat area above the harbor is open range land, with several buildings formerly used by the U.S. Coast Guard and now used by the USAF for social functions. The harbor was excavated by blasting the shallow bedrock and excavating the rubble with a dredge to a depth of at least 10 feet below MLLW. The dock is an earth-filled concrete and asphalt structure approximately 240 feet long and 100 feet wide. A low breakwater roughly 500 feet in length and 15 to 20 feet above MLLW protects the harbor.

Reportedly, the harbor has been used twice since it was last dredged in 1989. On both occasions, the harbor and dock were used as offloading points for cargo brought onto the Base by ship. Presently, sediment has accumulated near the base of the dock so that vessels cannot tie up for an extended period of time. No USAF or other military vessels are based or operate out of the harbor and the harbor is off limits to civilian boat traffic. There are no Installation Restoration Program (IRP) sites or Area of Concern (AOC) locations in or adjacent to the project areas.

USAF personnel and their guests use the harbor and adjacent beach area for picnicking, diving, swimming, fishing, and other recreational opportunities. Approximately 1,800 persons use this area annually. The harbor area is closed for several hours prior to low-azimuth Atlas, Delta, and Titan launches.

Federal projects in, or affecting, a coastal zone require preparation of a Coastal Zone Consistency Determination, in accordance with the federal Coastal Zone Management Act (CZMA) of 1972, as amended by Public Law ([PL] 92-583), and implemented by the National Oceanic and

Atmospheric Administration. The CZMA was passed to preserve, protect, develop, and, where possible, restore or enhance the nation's natural coastal zone resources, which include wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife and their habitat. The Act also requires management of coastal development to minimize the loss of life and property caused by improper development in a coastal zone. Responsibility for administering the Coastal Zone Management Plan (CZMP) has been delegated to states that have developed state-specific guidelines and requirements. A federal agency must ensure that activities within the coastal zone and over which it has control are consistent with that state's coastal zone management program.

In California, the California Coastal Zone Management Program was formed through the California Coastal Zone Conservation Act of 1972. The USAF is responsible for making final coastal zone consistency determinations for federal projects on VAFB, and the CCC reviews federally authorized projects for consistency with the California Coastal Zone Management Program.

3.2 Air Quality

The air quality in and around VAFB and the regulatory setting for air quality on VAFB are described comprehensively in Section 3.10 of the FEIS and updated in Section 3.10 of the SEIS. Air quality at the harbor is expected to be comparable to or better than VAFB in general, since the harbor is exposed to the open ocean breezes and isolated from most of the rest of VAFB by coastal foothills.

The California Air Resources Board (CARB) classifies areas as in attainment or non-attainment consistent with the California Ambient Air Quality Standards (CAAQS). In California, air quality is assessed on a county and regional basis. VAFB is in Santa Barbara County, which is part of the South Central Coast Air Basin (SCCAB). The SCCAB has been designated by CARB as being in attainment with the CAAQS for sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and carbon monoxide (CO) [USAF 1998]. VAFB has been designated non-attainment of CAAQS for particulate material less than 10 microns in diameter (PM₁₀) and for ozone (USAF 1998).

EPA uses two categories to characterize areas. These designations are attainment/non-attainment (areas that do/do not meet national standards) and unclassified (areas that cannot be classified). The SCCAB has been designated by the Environmental Protection Agency (EPA) as being in attainment with the National Ambient Air Quality Standards (NAAQS) for SO₂, NO₂, and CO and as being unclassified for PM₁₀ (USAF 1998).

EPA has classified the SCCAB, which includes VAFB, as being in serious non-attainment for the NAAQS for ozone (USAF 1998). Because the SCCAB is classified as a non-attainment area for

the federal ozone standard, conformity must be considered for nitrogen oxides (NO_x) and volatile organic compound (VOC) emissions, which are ozone precursors.

A Clean Air Act Conformity Applicability Analysis for VAFB was included as Appendix S of the SEIS and is included as **Appendix D** of this document. The elements discussed in this EA were included in that conformity analysis.

3.3 Water Resources

Water resources include groundwater and surface water and their physical, chemical, and biological characteristics. The water resources on and near VAFB are described in detail in Section 3.9 of the FEIS and updated in Section 3.9 of the SEIS. This section focuses on the physical and chemical factors that influence water quality and surface runoff in the harbor.

The federal Clean Water Act (CWA) is the primary law regulating water pollution. The CWA is administered by the EPA, which has delegated authority to the CCRWQCB. Treated water discharged to surface water or to the ocean is subject to the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, which ensures that the water discharged meets water quality standards at the point of discharge. In addition, projects disturbing five acres or more are subject to NPDES permit requirements for stormwater discharges during construction. This permit requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP). The California Porter-Cologne Water Quality Act implements the NPDES program for the state. Section 404 of the CWA requires permits from the USACE in order to discharge dredged or fill material into the waters of the United States. Section 10 of the Rivers and Harbors Act requires a permit from the USACE for dredging activities in navigable waters of the United States. Section 401 of the CWA requires dredge and fill operations to prevent deterioration of the water quality during dredging or deposition of fill material into waters of the United States.

The ocean water at the harbor is of high quality and is characteristic of open coast conditions along the central California coast (**Table 3-1**) (Chambers Consultants and Planners, 1980)¹⁰. The harbor is isolated from major sources of runoff and is rarely used except for land-based recreational activities. Thus, it receives little terrestrial influence beyond immediate local runoff. Runoff from the V-33 Tow Road leading to the harbor drains into the harbor via surface drainage channels located on either side of the dock. Runoff from the dock runs directly into the harbor. No other surface water sources affect the harbor water.

¹⁰ While these data are two decades old, the isolation of this portion of the coast results in few data being collected to measure water quality. For the reasons cited in the balance of the paragraph, the data are expected to still be representative of this area.

Table 3-1
Physical Characteristics of Water Quality in VAFB Harbor

Type of Characteristic	Range ^a	Desired Range	Interstitial Water Sample ^b
Salinity	28.6-32.6 ‰	32.5-34.5 ‰	34.4 ‰
PH	7.6-8.0	7.5-8.4	7.9
Dissolved Oxygen	Above 6.8 ml/L	Above 4 ml/L	Not measured
Source: a – Chambers Consultants and Planners, 1980 b - ENSR, 2001 ‰ = parts per thousand ml/L = milliliters per liter			

Because the project called for the removal of sediments and the disposal back into the ocean of interstitial water from the dewatering of those sediments, Boeing collected samples of the interstitial water, and analyzed the filtered and unfiltered water for 10 metals. The selection of the metals analyzed was based on the results of the earlier sediment analyses that are discussed in Section 3.9. The water sample was collected from in front of the dock during maximum low tide on one of the lowest tides of the year. A hole was dug roughly 12 inches deep into the exposed sediment and water was allowed to accumulate in the open hole. This water was collected into sample bottles and transported to the analytical laboratory.

The water sample was split for analysis. One subsample was filtered and the other was left unfiltered. Both samples were acidified and the concentrations of total metals were determined. The filtered sample was taken to represent the dissolved metals concentration while the unfiltered sample was taken to represent the total (particulate and dissolved) metals concentrations. The results from the analyses (as well as the detection limits for each metal) are presented in **Table 3-2**. The screening criteria for a low-threat discharge of water to the ocean are also presented on **Table 3-2**. Based on the limited analyses, neither the filtered nor unfiltered interstitial water will contain metals at concentrations in excess of standards of the Ocean Plan (SWRCB 1997). The laboratory results are presented in **Appendix B**.

3.4 Noise

The general characteristics of noise, the off-base ambient noise levels, and, the on-base ambient noise levels are described in detail in Section 3.12 of the FEIS. Noise levels at SLC-6 would be similar to levels in an urbanized industrial area when operations are taking place, averaging 50 to 60 decibels (dBA), although levels would exceed 130 dBA during launches. The harbor is roughly 2½ miles from SLC-6 and is shielded from SLC-6 by hills. As a result of this isolation, noise levels at the harbor are typical of a protected, open coast beach. There is a fairly constant background noise level from the surf on the adjacent beach. Acentech (1998) measured the ambient noise levels at the harbor between 35 and 48 decibels for a typical day (i.e., not notably windy, calm, or high surf).

**Table 3-2
Interstitial Water Sampling Results**

Metal	Unfiltered Sample (µg/L)	Filtered Sample (µg/L)	Ocean Plan (µg/L)	Method Reporting Limit (µg/L)
Arsenic	6	6	32	1.0
Cadmium	0.5	0.2	4	0.1
Chromium	2.7*	1.4	8**	0.4*
Copper	3.2	0.7	12	0.2
Lead	2.04	0.09	8	0.04
Mercury	ND	NA	0.16	0.2
Nickel	4	ND	20	0.4
Selenium	ND	ND	60	2.0
Silver	ND	ND	2.8	0.8
Zinc	9	2	80	1.0
	* total Cr		** as Cr-6	
ND - Not detected NA - Not analyzed				

3.5 Biological Resources

Section 3.14 of the FEIS provides a comprehensive discussion of biological resources on and near VAFB, including an extensive listing of both common (Table G-2) and special-status plant and animal species (Table 3.14-2) on VAFB. These tables have been included in **Appendices E** and **F** respectively, in order to provide the reader background information from the FEIS. The biological resources at or near the harbor include both terrestrial and marine species.

3.5.1 Common Species at the Project Sites

The following sections provide a discussion of common plants and animals living at or near the project site.

3.5.1.1 Terrestrial Species and Communities

The vegetation community on the bluff above the harbor consists of disturbed, non-native annual grassland that has been used for cattle grazing for over 60 years. Mark de la Garza conducted a survey of the terrestrial vegetation in July 2000 and Dr. Barbara Collins conducted a focused survey for three special-status species in November 2000. The methodology for the July survey consisted of a meandering pedestrian survey of the areas potentially affected by the project actions. Such a survey involves examining each of the project areas and identifying the main plant species found there. The survey included both the EPT turnaround and the temporary sediment storage area. Because the boundaries of these two areas were not marked, the survey characterized the vegetation in the roughly 15 acres in and around the area where these facilities are proposed. The dominant plant species present in the area are presented in **Table 3-3**.

Table 3-3
Dominant Plant Species Present in the Area of the Proposed
EPT Turnaround and Temporary Sediment Storage Area

Common Name	Scientific Name
Black mustard	<i>Brassica nigra</i>
California plantain	<i>Plantago erecta</i>
Coastal morning-glory	<i>Calystegia macrostegia</i> ssp. <i>Cyclostegia</i>
Common vetch	<i>Vicia sativa</i>
Coyote bush	<i>Baccharis pilularis</i>
Dove weed	<i>Eremocarpus setigerus</i>
Foxtail	<i>Hordeum murinum</i> ssp. <i>Glaucum</i>
Green everlasting	<i>Gnaphalium californicum</i>
Italian rye	<i>Lolium multiflorum</i>
Lupine	<i>Lupinus</i> sp.
Mock heather	<i>Ericameria ericoides</i>
Sawtooth goldenbush	<i>Hazardia squarrosa</i> var. <i>squarrosa</i>
Soft chess brome	<i>Bromus hordeaceus</i>
Wild oat	<i>Avena fatua</i>

A reconnaissance level wildlife survey of the area was conducted by ENSR biologist Janet Ilse and ENSR contract biologist Lawrence E. Hunt on 25 September 2000. The purpose of this survey was to characterize wildlife habitat within and adjacent to the project areas and document any wildlife species present in the area either through direct observations or sign (tracks, burrows, scat, etc.). Prior to the survey, ENSR reviewed the California Natural Diversity Database (CNDDB) for this area and determined that no special-status wildlife species were identified for

this area. However, because the CNDDDB is not comprehensive, especially for resources on federal properties such as VAFB, Nancy Read, the VAFB wildlife biologist, (Read 2000) and Lee Ann Naue, USFWS, (Naue 2000) were consulted concerning special-status wildlife species that may inhabit or frequent the project areas. Based on these discussions, the only terrestrial special-status wildlife species expected to occur at the site are the Peregrine falcon (*Falco peregrinus anatum*) and the Western burrowing owl (*Athene cunicularia hypugea*).

The reconnaissance survey for wildlife and wildlife sign consisted of random walks over the temporary sediment storage area and the EPT turnaround. Because these project areas were not delimited at the time of the site visit, the walkover survey covered the entire 15-acre area west of the Boathouse, including the proposed project areas. The type and extent of vegetation was noted in order to determine the quality and quantity of wildlife habitat in the area and to characterize the relationship of the project areas to surrounding habitat.

Particular attention was paid to habitat and physical features that are required by certain wildlife species with a high potential for occurrence in the project areas. These species either have low dispersal ability within suitable habitat or exhibit high site fidelity for distinctive site features such as nests or burrows. For example, surface conditions that would indicate site occupancy by western burrowing owls (*Athene cunicularia hypugea*) (e.g., California ground squirrels and their burrow systems), were evaluated. Soil conditions, specifically sand content, were noted to characterize the potential for occurrence of other special-status vertebrates, such as the California horned lizard (*Phrynosoma coronatum frontale*) and silvery legless lizard (*Anniella pulchra pulchra*).

Specific protocol-level surveys for wildlife species were not undertaken because site conditions within the project areas were found to have low or no potential of supporting special-status species, based on the initial reconnaissance-level survey.

Terrestrial wildlife species observed or potentially present in the area above the harbor are listed in **Table 3-4**. Three common species of lizards, western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Gerrhonotus multicarinatus*), and side-blotched lizards (*Uta stansburiana*) were observed on the project sites during the reconnaissance survey. Several species of birds were observed within or adjacent to the project site. These birds included Western gulls (*Larus occidentalis*), Yellow-rumped warbler (*Dendroica coronata*), Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), and California towhee (*Pipilo crissalis*). Mammal sign, in the form of burrows and scat, respectively, were found at the project site for two species, Botta's pocket gopher (*Thomomys bottae*) and brush rabbit (*Sylvilagus bachmani*).

Table 3-4
Terrestrial Wildlife Species Potentially Occurring in the Proposed Project Areas

Common Names	Scientific Name	Observed on Site*
Reptiles		
Common garter snake	<i>Thamnophis ordinoides</i>	-
Common king snake	<i>Lampropeltis getulus</i>	-
Gopher snake	<i>Pituophis melanoleucus</i>	-
Racer	<i>Coluber constrictor</i>	-
Ringneck snake	<i>Diadophis punctatus</i>	-
Side-blotched lizard	<i>Uta stansburiana</i>	O
Southern alligator lizard	<i>Gerrhonotus multicarinatus</i>	O
Western fence lizard	<i>Sceloporus occidentalis</i>	O
Western rattlesnake	<i>Crotalus viridis</i>	-
Western skink	<i>Eumeces skiltonianus</i>	-
Birds		
American crow	<i>Corvus brachyrhynchos</i>	-
American goldfinch	<i>Carduelis tristis</i>	-
Anna's hummingbird	<i>Calypte anna</i>	-
Barn owl	<i>Tyto alba</i>	-
Bewick's wren	<i>Thryomanes bewickii</i>	-
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	O
Bushtit	<i>Psaltiriparus minimus</i>	-
California quail	<i>Callipepla californica</i>	-
California towhee	<i>Pipilo crissalis</i>	O
European starling	<i>Sturnus vulgaris</i>	-
Great horned owl	<i>Bubo virginianus</i>	-
House finch	<i>Carpodacus mexicanus</i>	O
House sparrow	<i>Passer domesticus</i>	-
Killdeer	<i>Charadrius vociferus</i>	-
Mourning dove	<i>Zenaidura macroura</i>	-
Northern harrier	<i>Circus cyaneus</i>	D
Peregrine falcon**	<i>Falco peregrinus anatum</i>	-
Red-shouldered hawk	<i>Buteo lineatus</i>	-
Red-tailed hawk	<i>Buteo jamaicensis</i>	-
Song sparrow	<i>Melospiza melodia</i>	-
Turkey vulture	<i>Cathartes aura</i>	D
Western bluebird	<i>Sialia mexicana</i>	-
Western burrowing owl**	<i>Athene cunicularia hypugea</i>	-
Western gull	<i>Larus occidentalis</i>	O
Western scrub jay	<i>Aphelocoma californica</i>	-
White-tailed kite	<i>Elanus caeruleus</i>	D
Yellow-rumped warbler	<i>Dendroica coronata</i>	-

Table 3-4 (cont.) Terrestrial Wildlife Species Potentially Occurring in the Proposed Project Areas		
Mammals		
American Badger	<i>Taxidea taxus</i>	-
California ground squirrel	<i>Spermophilus beecheyi</i>	-
California mouse	<i>Peromyscus californicus</i>	-
California vole	<i>Microtus californicus</i>	-
Coyote	<i>Canis latrans</i>	-
Botta's pocket gopher	<i>Thomomys bottae</i>	B
Broad-footed mole	<i>Scapanus latimanus</i>	-
Brush rabbit	<i>Sylvilagus bachmani</i>	S
Deer mouse	<i>Peromyscus maniculatus</i>	-
House mouse	<i>Mus musculus</i>	-
Roof rat	<i>Rattus rattus</i>	-
*O – observed onsite B – burrows onsite ** See discussion in Section 3.5.2.		
S – scat onsite D – observed at a distance from the site		

3.5.1.2 Marine Species

The harbor supports a diversity of habitats including soft bottom and hard bottom communities in both the intertidal and subtidal zones. The substrate within the harbor where the dredging is to occur is predominantly sand, while the shoreline and shallow subtidal zone adjacent to the dock is a mixture of rocky outcroppings and sandy pockets. There are several submerged reefs in the general harbor area, including several just inside the breakwater placed there as mitigation for the original dredging. These reefs, as well as the breakwater, offer hard substrate for colonization by many marine organisms.

The USAF commissioned a set of studies of the local intertidal and subtidal communities prior to and following the construction of the dock (Chambers Consultants and Planners 1980). In support of the current EA and the associated permitting effort, Chambers Group performed a follow up survey in September 2000. The survey lasted 3 days and consisted of underwater observations and transects within the harbor embayment, intertidal transects north of the dock, and visual observations of fishes by SCUBA diving and free diving. Detailed discussion of the survey methodologies is presented in the report prepared for this survey, which is included as **Appendix G**.

Historic Surveys

Prior to the construction of the dock, the intertidal hard bottom substrates were dominated by the red algae (*Gigartina canaliculata*) and surf grasses (*Phyllospadix torreyi* and *P. scouleri*). Subtidally, the dominant plants were the palm kelp, *Pterogophera californica*, and the red algae

Cryptoplerua violacea, *Stenogramme interrupta*, and *Neoagardhiella baileyi* (Chambers Consultants and Planners 1980).

The original soft bottom community was dominated by active, fast moving crustaceans such as the cumaceans *Lamprops* sp. and *Cyclaspis*, sp. and the amphipods *Eohaustorius* sp. and *Synchelidium* spp. as well as the polychaete *Dispio uncinata*.

Fish in the area were reported to be typical of other parts of the Central California coast. Over the course of the sampling year, the most abundant species caught in gill nets were the walleye surfperch (*Hyperprosopon argenteum*), the top smelt (*Atherinops affinis*), the striped seaperch (*Embiotoca lateralis*), the queenfish (*Seriphus politus*), and the spiny dogfish (*Squalus acanthias*) (Chambers Consultants and Planners 1980).

The Chambers 1980 report indicated that the near-shore environment is characterized by a great deal of sand movement that affects community composition. The shifting sand opened up small areas for colonization and acted to select species that can withstand being buried. According to Chambers Consultants and Planners (1980), most of the characteristic species of the VAFB harbor tend to be either tolerant to sand burial and/or sand abrasion or rapid colonizers.

Current Surveys

Most of the substrate within the proposed dredging footprint consists of sand. This sand appears to be a relatively thin layer covering rocks. In many places kelp or red algae, apparently anchored to underlying rocky substrate, were visible above the sand. A few broken rocks that were probably shattered during the 1984 dredging were seen. In the outer (eastern) portions of the area near the end of the breakwater and the mooring dolphins, the substrate consists primarily of cobble with a flora of red algae and kelp of all age classes from recruit to adult. This outer portion of the dredging footprint supports a couple of fairly large patches of kelp (**Figures 3-1 and 3-2**). Small patches of kelp occur in the inner portions of the dredging footprint closer to the dock. These small patches consist of one or two kelp plants, either growing on rock buried by sand or on the few broken rocks that emerge above the sand cover. Each of these small kelp patches had fishes associated with it. It is estimated that the amount of kelp canopy within the proposed dredge footprint is about 10,000 square feet (0.2 acre) and represents less than 1 percent of the total kelp in front of and down coast of the breakwater.

The area adjacent to the dredge footprint to the north consists of mixed sand and rock, with patches of abundant surf grass, giant kelp and feather boa kelp growth. The habitat and associated subtidal biota were similar to those observed during earlier surveys (Chambers Consultants and Planners 1980 and 1984, Chambers Group 1986).

Figure 3-1 Surface Kelp Within The Dredge Footprint

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Figure 3-2 VAFB Breakwater at Low Tide

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As compensation for impacts to the hard bottom community excavated when the harbor was dredged in 1983, the Air Force constructed an artificial reef by placing a series of rock piles between the mooring dolphins and the breakwater. These mitigation reefs now support a lush kelp bed (**Figure 3-2**) and provide valuable habitat for a variety of species. Mean density of *Macrocystis* was about 0.4 plants per square meter. *Macrocystis* density on the reef is much greater than in the area of the dredge footprint or north of the dredge footprint. Many of the giant kelp plants on this reef are large. In addition to giant kelp, the reef supports two smaller kelp species, *Egregia menziesii* and *Cystoseira osmundacea*. Many small individuals of spiny lobster, *Panulirus interruptus*, were observed in the crevices between the rocks. The mitigation for the loss of the hard bottom substrate through the creation of the artificial reef was quite successful.

Organisms along the intertidal transects showed the zonation of intertidal species that is typical of the California coast. The highest intertidal was dominated by barnacles (*Chthamalus fissus* and *Chthamalus dali*), littorine snails (*Littorina planaxis*), and limpets (*Collisella* sp.). Invertebrates that were observed during the survey are shown on **Table 3-5**. A variety of red algae species, particularly *Gigartina papillata* and *Gigartina canaliculata*, characterized the mid-intertidal. The three lower intertidal transect portions were dominated by surf grass (*Phyllospadix torreyi*). Plants and algae that were observed during the survey are shown on **Table 3-6**. The harbor area intertidal communities were similar to those observed in earlier surveys.

A total of 43 fish species were identified within the harbor embayment during the 2000 survey (Chambers 2000). The most abundant fishes observed during the survey were four species of surfperch (*Brachyistius frenatus*, *Damalichthys vacca*, *Micrometrus minimus*, and *Hyperprosopon argenteum*) and topsmelt (*Atherinops affinis*). A list of fish species observed in the September 2000 survey is presented in **Table 3-7**.

Marine Birds and Marine Mammals

Marine birds that may breed in the vicinity of the harbor (from Rocky Point to Point Arguello) may also use the breakwater and harbor area for resting and/or foraging. A list of regularly occurring marine birds is shown in **Table 3-8**. Marine mammals that occur in the harbor are protected by the Marine Mammal Protection Act (MMPA), with the exception of the southern sea otter, which is protected under the federal Endangered Species Act. For this reason, they are discussed in section 3.5.2.2. No federally listed pinnipeds or cetaceans are expected to occur in the project area.

3.5.2 Special-Status Species

Both special-status plants and animals could be present in the project area. Special-status plants and animals potentially occurring in the project area are discussed in the following subsections.

Table 3-5
Invertebrates Observed During September 2000 Intertidal and Subtidal Surveys

Coelenterata	
<i>Anthopleura artemesia</i> <i>Anthopleura elegantissima</i>	<i>Harenactis attenuata</i> <i>Tealia sp.</i>
Annelida	
<i>Diopatra ornata</i> <i>Phragmatopoma californica</i>	<i>Pista alata</i>
Arthropoda	
<i>Balanus sp.</i> <i>Balanus glandula</i> <i>Chthamalus fissus/dalli</i> <i>Cancer antennarius</i> <i>Pachygrapsus crassipes</i>	<i>Pagurus sp.</i> <i>Pagurus hirsutiussculus</i> <i>Pagurus samuelis</i> <i>Panulirus interruptus</i> <i>Pugettia producta</i>
Mollusca	
<i>Collisella digitalis</i> <i>Collisella limatula</i> <i>Collisella pelta</i> <i>Collisella scabra</i> <i>Littorina planaxis</i> <i>Norrisia norrisi</i> <i>Notoacmaea incesso</i> <i>Polinices lewisii</i>	<i>Serpulorbis squamigerus</i> <i>Tegula funebris</i> <i>Cyanoplax sp.</i> <i>Lepidozonia sp.</i> <i>Mopalia muscosa</i> <i>Mytilus californianus</i> <i>Octopus sp.</i>
Echinodermata	
<i>Asterina miniata</i> <i>Pisaster ochraceus</i>	<i>Parastichopus parvimensis</i>
Urochordata	
<i>Styela montereyensis</i>	

Table 3-6
Plants and Algae Observed During September 2000 Intertidal and Subtidal Surveys

Tracheophyta	
Phyllospadix torreyi	
Chlorophyta	
Cladophora sp.	Ulva sp.
Phaeophyta	
Colpomenia sinuosa Cystoseira osmundacea Desmerestia ligulata Egregia menziesii Fucus distichus	Hesperophycus harveyanus Laminaria sp. Marcrocystis pyrifera Pelvetia fastigiata Ralfsia sp.
Rhodophyta	
Bossiella sp. Chondria nidifica Corallina sp. Cryptopleura violacea Cumagloia andersonii Endocladia muricata Gastroclonium coulteri Gelidium sp. Gigartina canaliculatus Gigartina corymbifera Gigartina harveyanus Gigartina papillata Gracilaria sjoestedtii Gracilaria textorii var. cunninghamii Gymnogongrus leptophyllus	Iridaea flaccida Iridaea sanguinea Janzewskia lappacea Microcladia borealis Neoagardhiella baileyi Nienburgia andersoniana Porphyra perforata Prionitis sp. Prionitis lanceolata Prionitis lyalli Pterosiphonia baileyi Rhodoglossum affine Rhodoglossum californicum Rhodymenia sp

Table 3-7
Fish Species Observed During the September 2000 Surveys

Common name	Scientific Name	Fisheries Management Plan
Leopard shark	<i>Triakis semifaciata</i>	G
Thornback ray	<i>Platyrrhinoidis triseriata</i>	N
Round stingray	<i>Urolophus halleri</i>	N
Northern anchovy	<i>Engraulis mordax</i>	P
Jacksmelt	<i>Atherinopsis californiensis</i>	N
Topsmelt	<i>Atherinops affinis</i>	N
Tubesnout	<i>Aulorhynchus flavidus</i>	N
Pipefish	<i>Syngnathus</i> sp.	N
Grass rockfish	<i>Sebastes rastrelliger</i>	G
Yellowtail rockfish	<i>Sebastes flavidus</i>	G
Treefish	<i>Sebastes serriceps</i>	G
Black rockfish	<i>Sebastes melanops</i>	G
Silvergray rockfish	<i>Sebastes brevispinis</i>	G
Olive rockfish	<i>Sebastes serranoides</i>	G
Blue rockfish	<i>Sebastes mystinus</i>	G
Spotted scorpionfish or Sculpin	<i>Scorpaena guttata</i>	G
Painted greenling	<i>Oxylebius pictus</i>	N
Kelp greenling	<i>Hexagrammos decagrammus</i>	G
Lingcod	<i>Ophiodon elongatus</i>	G
Cabazon	<i>Scorpaenichthys marmoratus</i>	G
Fluffy sculpin	<i>Oligocottus snyderi</i>	N
Tidepool sculpin	<i>Oligocottus</i> sp.	N
Kelp bass	<i>Paralabrax clathratus</i>	N
Opaleye	<i>Girella nigricans</i>	N
Striped surfperch	<i>Embiotoca lateralis</i>	N
Rubberlip surfperch	<i>Rhacochilus toxotes</i>	N
Pile surfperch	<i>Damalichthys vacca</i>	N
Black surfperch	<i>Embiotoca jacksoni</i>	N
Rainbow surfperch	<i>Hypsurus caryi</i>	N
Walleye surfperch	<i>Hyperprosopon argenteum</i>	N
Kelp surfperch	<i>Brachyistius frenatus</i>	N
Dwarf surfperch	<i>Micrometrus minimus</i>	N
Shiner surfperch	<i>Cymatogaster aggregata</i>	N
Barred surfperch	<i>Amphistichus argenteus</i>	N
Calico surfperch	<i>Amphistichus koelzi</i>	N
Crevice kelpfish	<i>Gibbonsia montereyensis</i>	N
Spotted kelpfish	<i>Gibbonsia elegans</i>	N
Giant kelpfish	<i>Heterostichus rostratus</i>	N
Striped kelpfish	<i>Gibbonsia metzi</i>	N
Blackeye goby	<i>Oryphopterus nicholsii</i>	N
California halibut	<i>Paralichthys californicus</i>	N
Speckled sanddab	<i>Citharichthys stigmaeus</i>	N
Hornyhead turbot	<i>Pleuronichthys verticalis</i>	N
G = West Coast Groundfish Fisheries Management Plan P = Coastal Pelagic Fisheries Management Plan N = No Management Plan		

Table 3-8
Marine Birds and Mammals Potentially Occurring in the Project Areas

Common Name	Scientific Name
Birds	
Black oystercatcher	<i>Haematopus bachmani</i>
Brandt's cormorant	<i>Phalacrocorax penicillatus</i>
Clark's grebe	<i>Aechmophorus clarkii</i>
Common loon	<i>Gavia immer</i>
Pacific loon	<i>Gavia pacifica</i>
Pelagic cormorant	<i>Phalacrocorax pelagicus</i>
Pigeon guillemot	<i>Cepphus columba</i>
Rhinoceros auklet	<i>Ceroryhinca monocerata</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Western gull	<i>Larus occidentalis</i>
Mammals	
California gray whale	<i>Eschrichtius robustus</i>
California sea lion	<i>Zalophus californianus</i>
Common dolphin	<i>Delphinus delphis</i>
Northern elephant seal	<i>Mirounga angustirostris</i>
Pacific harbor seal	<i>Phoca vitulina</i>
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>
Southern sea otter	<i>Enhydra lutris neveis</i>

3.5.2.1 Special-Status Plants

Based on his local knowledge of the habitats and vegetative communities at the site, Dr. Chris Gillespie, the VAFB botanist, indicated that no special-status plants were likely to occur on the areas that would be affected by the project, although three special-status plants could occur in the general project vicinity (Gillespie, 2000a). Two of these species are federal species of concern, the black-flowered figwort (*Scrophularia atrata*) and the San Luis Obispo monardella (*Monardella frutescens*). The third species, Gaviota tarplant (*Deinandra increscens* ssp. *villosa*) is federally listed as endangered. These species are listed in **Table 3-9**. The USFWS (Carranza, 2000) recommended relying on Dr. Gillespie's knowledge of the area's vegetative communities in suggesting surveys for special-status species in the project area. As of September 2000, no special-status species were listed in the California Natural Diversity Database of the project area. Based on these sources, a general vegetation survey was completed in July 2000 and was augmented in November 2000 with a focused survey for the three special-status plants potentially occurring in the general project area. Both surveys consisted of meandering pedestrian surveys across the sites potentially affected by the project actions. Plants growing in or near the potentially affected areas were identified and presented in **Table 3-3**.

**Table 3-9
Federal Special Status Species Potentially Occurring in the Proposed Area**

Common Name	Scientific Name	Federal Status
Plants		
San Luis Obispo monardella	<i>Monardella frutescens</i>	FSC
Gaviota tarplant	<i>Deinandra increscens</i> ssp. <i>villosa</i>	FE
Black-flowered figwort	<i>Scrophularia atrata</i>	FSC
Birds		
Peregrine falcon	<i>Falco peregrinus anatum</i>	FD
Western burrowing owl	<i>Athene cunicularia hypugea</i>	FSC
California brown pelican	<i>Pelecanus occidentalis californicus</i>	FE
Mammals		
Southern sea otter	<i>Enhydra lutris nereis</i>	FT
Pacific harbor seal	<i>Phoca vitulina</i>	MMPA
California sea lion	<i>Zalophus californianus</i>	MMPA
Northern elephant seal	<i>Mirounga angustirostris</i>	MMPA
Common dolphin	<i>Delphinus bairdi</i>	MMPA
Pacific white-sided dolphin	<i>Lagenorhynchus obliquidens</i>	MMPA
California gray whale	<i>Eschrichtius robustus</i>	MMPA
Note: *Other pinnipeds and cetaceans that have a remote potential for occurring in the general vicinity of the project are listed in Table 3.14-2 of the FEIS as threatened, endangered, or candidate species occurring or potentially occurring at VAFB. (Appendix E). FE = Federally listed as endangered FT = Federally listed as threatened FSC = Federal species of concern FD = Recently federally delisted MMPA = Protected under the Marine Mammal Protection Act		

During the November 2000 survey performed by Dr. Barbara Collins of California Lutheran University, the site was specifically examined for the presence of the black-flowered figwort, the San Luis Obispo monardella, and Gaviota tarplant. None of the three special-status plants were found on the project site. The San Luis Obispo monardella is a perennial with a thick woody root. It normally grows in sandy soil or on stabilized dunes. Because the soil of the project site is a calcareous clay soil with fragments of diatomaceous shale, the presence of the San Luis Obispo monardella would not be expected.

The Gaviota tarplant is known from at least two locations on VAFB, near Oak Mountain and Lion's Head on North VAFB (Gillespie 2000b). It is usually found in coastal scrub and grazed annual grasslands, and blooms from May through November. The Gaviota tarplant was not observed during the survey. Because the survey was made during the blooming period, it would have been observed if it had been present. Most of the area where the projects would be located is weedy and grazed. Bordering the site of the proposed EPT Turnaround, at the north end, the vegetation becomes more shrubby and the area appears to be less disturbed. In this region, a tarweed was

observed that was in bloom. The species, however, was the more common *Deinandra paniculata* and not the rare endangered *Deinandra increscens* ssp. *villosa*.

The black flowered figwort is a perennial with a four-angled stem, 3½ to 4 feet high. Although it blooms from April to June, remnants of it would be expected to be present during the time of the survey. No evidence of the black flowered figwort was observed. The plant normally occurs in coastal sage scrub or chaparral, and the vegetation at the project site would not be described as coastal sage scrub or chaparral. Coyote bush, sawtooth goldenbush, and mock heather were the only shrubs present, and these were widely spaced between disturbed grassy areas consisting of non-native plants. Therefore, it is unlikely that the black flowered figwort would be present on the project site.

3.5.2.2 Special-Status Animals

Based on local knowledge of the site (Read, 2000, Harris, 2000), a variety of previous surveys (Holmgren and Collins, 1999, Tetra Tech, 1997, Coulombe and Mahrtdt, 1975), and a site survey for wildlife conducted by ENSR in September 2000, a number of special-status wildlife species are known or likely to occur in the proposed project areas. These species are listed in **Table 3-9** and are discussed below.

Much of VAFB's coastal strand was recently designated critical habitat for the federally threatened western snowy plover (*Charadrius alexandrinus nivosus* [U.S. Department of the Interior, 1999]). However, the beaches adjacent to the harbor are too narrow and lack the protected dunes required by plovers. Based on this lack of suitable habitat adjacent to the harbor, this area has been excluded from the critical habitat designation, and snowy plovers are not known to use any beaches in the project vicinity.

Western burrowing owls (*Athene cunicularia hypugaea*), a federal Species of Concern, are occasional winter visitors to VAFB, although breeding has apparently not occurred since 1979-80. Breeding burrowing owls have not been reported in the project area since Al Naydol, Chief of Natural Resources at VAFB, reported the presence of four to five breeding pairs in the area between 1979 and 1980 (Whitney and Kudrak, 1999). During a study conducted between 1995 and 1997, the majority of the burrowing owl sightings occurred on north VAFB although wintering burrowing owls have been reported within a mile of the site as recently as January 1, 2001 (Read 2001). Although they could occur there, breeding in the project area is not expected to occur based on lack of occurrence in recent years (Read, 2000).

American peregrine falcons (*Falco peregrinus anatum*) were recently federally delisted, but are still listed by the State of California as endangered and are of special interest on VAFB. These birds have been seen foraging over South VAFB including SLC-6 and the harbor area. The birds

nest along the South VAFB shoreline, although the nearest nesting site is well over three miles from the harbor (Read, 2000). Specific surveys were not undertaken to determine the presence of this species near the harbor since there is no suitable nesting habitat in the project vicinity.

No other special-status species are expected to make use of the terrestrial area above the harbor, except possibly as rare visitors to the site.

Several species of sea birds and marine mammals that may occur at the harbor are federally listed special-status species. These include California brown pelicans (*Pelecanus occidentalis californicus*), Southern sea otters (*Enhydra lutris nereis*), Pacific harbor seals, and California sea lions (*Zalophus californianus*). No special-status species are known to nest or breed within 1 mile of the harbor (Read, 2000).

The federally endangered California brown pelican is a common visitor to the harbor. Surveys by Pereksta (1996) found that up to 30 individuals used the breakwater or near-shore rocks, although during many observation periods there were no individuals roosting. During many of the observation periods, individuals were observed flying in the area even when none were roosting at the site. Pelicans generally forage close to shore, although they may venture farther out to sea during calm weather (USAF 1994).

The federally threatened Southern sea otter (*Enhydra lutris nereis*) has been observed in the harbor, but those individuals observed are assumed to be solitary males at the edge of their range (Harris, 2000). Small patches of kelp grow in the northern portion of the vessel maneuvering area and a larger patch grows between the mooring dolphins and the breakwater. The visiting otters use this kelp to rest in the calm water. A breeding population occurs off Purisima Point, approximately 14 miles northwest of the harbor, although no breeding has been observed in the harbor.

A few pacific harbor seals (*Phoca vitulina*) make routine use of the beach west of the harbor for hauling out although their numbers are typically less than a dozen. More commonly, harbor seals will haul out on the rock just offshore of the end of the breakwater (Read 2001). Beaches farther to the west and north are used far more extensively by harbor seals and a variety of other pinnipeds for both hauling out and pupping. Roest (1995) wrote that "according to Elias (1987), an Environmental Impact Assessment conducted for the Air Force in 1980 to determine the impact of Space Shuttle operations to the surrounding environs identified four to six harbor seals at the Point Arguello Boathouse area, with a maximum of 16 harbor seals during the breeding season." However, Roest did not identify the harbor area as a known site for marine mammals (Table 1, Page 20, Roest 1995). Other pinnipeds, such as the California sea lion and northern elephant seal (*Mirounga angustirostris*) are infrequent visitors to the beaches around the harbor (Roest, 1995).

On March 1, 1999, the NMFS authorized a programmatic agreement with VAFB for the “taking” of specific pinnipeds by launch and launch-related activities (NMFS 1999). The “taking” resulted from pinnipeds showing a startle response upon hearing and/or seeing the launch vehicle or helicopter overflights prior to the launches. The programmatic authorization is specifically for existing launch vehicles and does not currently apply to the EELV vehicles. However, the USAF is in the process of requesting that the rule be modified for inclusion of the EELV launch activities. The programmatic agreement does not apply to the activities at the harbor described in this EA.

Cetaceans such as the common dolphin (*Delphinus bairdi*) and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) are common along VAFB and could occur within the harbor. The California gray whale (*Eschrichtius robustus*) annually passes by VAFB on its migration between Alaska and Baja California to breed. It routinely can be sighted along the VAFB coast between December and May each year. Other whales occur along the VAFB coast, although no whales are expected to be common visitors to the harbor (Tetra Tech, 1997). Whales that commonly occur along the VAFB coast are listed in Table G-2 of the FEIS which is included in **Appendix E** of this EA.

3.5.3 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires that the NMFS be consulted when a federal action could affect one or more fish species for which a Fisheries Management Plan has been developed. In support of the SEIS, the USAF prepared an assessment of the Essential Fish Habitat (EFH) for fish species at VAFB that could be affected by the EELV program. The EFH analysis concluded that only under a launch anomaly with debris falling in the shallow, near-shore environment was there a significant potential for an EFH impact.

There are 83 groundfish species that are managed under the West Coast Groundfish Fishery Management Plan. Of the 83 species, 12 were identified during the September 2000 survey (Chambers Group 2000). These species are listed in **Table 3-10**. Four additional species in the West Coast Groundfish Fishery Management Plan were collected in the 1978/1979 survey (Chambers Consultants and Planners, 1980), but were not observed during the September 2000 survey. Those species are also included in **Table 3-10** and are expected to occur at the site. An Essential Fish Habitat Assessment is presented in **Appendix H**.

Five species are listed in the Coastal Pelagics Species Fisheries Management Plan. Only one of these, the northern anchovy (*Engraulis mordax*), was recorded during the 2000 survey. Larvae of northern anchovy and jack mackerel (*Trachurus symmetricus*) were collected by plankton tows during the 1978/1979 survey (Chambers Group 1980).

Table 3-10
EFH Species Observed in 1978/79 and 2000 Fish Surveys at the Harbor

Groundfish Species	
Common Name	Scientific Name
Leopard shark	<i>Triakis semifaciata</i>
Grass rockfish	<i>Sebastes rastrelliger</i>
Yellowtail rockfish	<i>Sebastes flavidus</i>
Treefish	<i>Sebastes serriceps</i>
Black rockfish	<i>Sebastes melanops</i>
Silvergrey rockfish	<i>Sebastes brevispinus</i>
Olive rockfish	<i>Sebastes serranoides</i>
Blue rockfish Spotted scorpionfish	<i>Sebastes mystinus Scorpaena guttat)</i>
Kelp greenling	<i>Hexagrammos decagrammus</i>
Lingcod	<i>Ophiodon elongatus</i>
Cabazon	<i>Scorpaenichthys marmoratus</i>
Spiny dogfish*	<i>Squalus acanthias</i>
Black and yellow rockfish*	<i>Sebastes chrysomelas</i>
Kelp rockfish*	<i>Sebastes atrovirens</i>
Brown rockfish*	<i>Sebastes auriculatus</i>
Pelagic Species	
Northern anchovy	<i>Engraulis mordax</i>
Jack mackerel *	<i>Trachurus symmetricus</i>
* Found only in 1978/1979 survey	

The Pacific Fisheries Management Council lists the life history information and other applicable information in the EFH publication. This information is available on the Internet at swr.ucsd.edu/hcd/grndfsh.pdf and www.nwr.noaa.gov/1sustfsh/efhappendix/page1.html.

3.6 Hazardous Materials and Hazardous Wastes

Hazardous materials at VAFB are subject to regulation under state, local, and federal laws and regulations and select AFIs. Hazardous wastes are regulated by the federal Resource Conservation and Recovery Act (RCRA), in accordance with the EPA, and the California Department of Toxic Substances Control (DTSC).

For the purposes of this project, there will be no hazardous materials or hazardous waste stored in the vicinity of the harbor or the EPT turnaround. No hazardous materials would be used for any of the project elements, aside from fuels and lubricants used in the vehicles and the vessel.

Boeing hazardous waste is regulated under RCRA and by the California DTSC. Lease and License agreements between Boeing and the USAF require that Boeing manage, handle, store, transport, dispose, and recycle its hazardous waste. Boeing has its own EPA identification

number [CAR000058024]. All Boeing hazardous waste is labeled with this identification number. The only hazardous waste generated at the dock area would be the result of a spill cleanup. This waste would be transported to Boeing's facilities at SLC-6 for proper handling and disposal.

Vessels operating in the harbor are required by state and federal law to have oil spill contingency plans.

3.7 Cultural Resources

Because of the extensive historic use of the project area, cultural resources are abundant in the project area. Cultural resources are discussed in general in Section 3.15 of the FEIS, but little specific information deals with the project area.

3.7.1 Cultural Setting

The following subsection briefly describes the prehistoric, ethnohistoric, and historic cultural setting of the project area.

3.7.1.1 Prehistoric

VAFB lies within the ethnographic territory of the Chumash, one of the most populous and socially complex Native American groups in California. The Chumash people lived between Malibu and San Luis Obispo, on the Northern Channel Islands, and east as far as the edge of Kern County. Most of what is known about the Chumash comes from studies of the Santa Barbara Channel and offshore islands. However, archaeological investigations on VAFB, particularly within the last two decades, have improved current understanding of prehistory north of Point Conception; excellent overviews are provided in Glassow, *et al.* (1990) and Woodman, *et al.*, (1991). A brief synthesis of the area's prehistory is presented in *Archaeological Investigations for the Proposed Boeing Elevated Platform Transporter Turnaround Pad*, (Harro and Gerber, 1999a), which is included as confidential **Appendix I**. The data from VAFB contribute significantly to our understanding of the Chumash in this region.

The broad patterns of regional prehistory are well known, having been developed by numerous researchers over many decades. In general, Early Holocene (ca. 8000 to 6000 B.C.) people of the greater Santa Barbara Channel region lived in small groups with relatively egalitarian social organization, had simple technology, and subsisted on a mixture of plant foods, shellfish, and a limited array of vertebrate species (Erlandson, 1994). During the Early Period (6000 to 1400 B.C.) technological changes included the addition of manos and metates (handstones and milling slabs) to the tool kit, probably indicating a greater reliance on hard seeds from the chaparral plant community. Toward the end of the Early Period, mortars and pestles were added to the artifact inventory, probably indicating systematic exploitation of acorns (Glassow *et al.*, 1988).

The Middle Period (1400 B.C. to A.D. 1150) is the time of technological innovation that included the development of the *tomol*, or plank canoe, and most of the sophisticated fishing technology used by the Chumash south of Point Conception until historic times. People began to rely increasingly on marine resources (fish in the south and mollusks in the north) for food (Glassow and Wilcoxon, 1988). There is some evidence for increasing population size during the Middle and Late periods, but no rigorous estimates of population size or density have been developed. North of Point Conception, the coast faces west and receives the full force of Pacific winds. It has been suggested that these factors prohibited the use of canoes in this region, thus creating a greater focus on terrestrial and near-shore resources (Glassow and Wilcoxon, 1988). Coastal settlements tended to be smaller than those along the Channel, and it does appear that population densities, in general, were lower north of Point Conception compared to the south (Harro and Gerber, 1999a).

This period is marked by continued subsistence intensification and increased technological and economic complexity. Major technological innovations include the introduction of the mortar and pestle, an increase in marine hunting equipment (south of Point Conception), and the bow and arrow. People began to rely increasingly on marine resources for food. This included fish and sea mammals on the south coast, but consisted primarily of shellfish on VAFB's coast. Indicative of this period is the development of interregional exchange as seen in a dramatic increase in obsidian and shell beads. Marked changes in ornaments and other artifacts have prompted some researchers to argue that social ranking and status differentiation became more pronounced during this period (King, 1990). However, others contend that prominent changes in socioeconomic complexity did not occur until later (Arnold, 1992; Jones and Waugh, 1995).

The Middle to Late Period transition (A.D. 1150 to 1300), called the Transitional Period by Arnold (1992), is believed by most local archaeologists to have been the time of emergent political complexity, development of social ranking, and the rapid development of craft specialization. Such complexity is most visible south of Point Conception, but the diversity and abundance of craft items and manufactured goods found in the VAFB region argues that a similar complexity also occurred north of the point (Glassow *et al.*, 1990). Later Period (A.D. 1300 to 1782) prehistoric cultures were probably quite similar to the Chumash societies encountered by the Spanish when they first arrived in the region.

3.7.1.2 Ethnohistoric

The Chumash living in the VAFB area have been grouped with the Purisimeño Chumash (Greenwood, 1978; King, 1984), whose range along the coast was from Point Conception to the Santa Maria River area (Osland, 1993). Their material culture, social organization, traditions and rituals, and cosmology are described in Blackburn (1975), Hudson *et al.* (1977), Hudson and Underhay (1978), and Johnson (1988).

The era of Chumash contact with Europeans began with initial Spanish exploration in 1542 (Landberg, 1965). In 1769, the Portolá expedition camped at *Nocto* on their journey overland from San Diego to Monterey, and passed through again on their return voyage in 1770. *Nocto* was a Chumash village of 60 to 70 people located about 1.25 miles east of the present-day Boathouse. Juan Bautista de Anza and his 240 companions also camped in the vicinity on their 1775-6 trip from Mexico to San Francisco. The next closest ethnographic village to the north was *Lompoc*, near the Santa Ynez River about 3 miles inland. *Silimastus* was located on the Santa Barbara Channel to the south, at Jalama.

Mission San Luis Obispo was founded in 1772, the first Spanish establishment in Chumash Territory (King, 1984), followed by Mission La Purisima Conception in 1788, in the present-day city of Lompoc, and Mission Santa Ynez in 1804. By 1803, La Purisima had removed most of the Chumash from the surrounding area, and by the time of secularization in 1834, missionization and disease had devastated the Chumash and their culture (Greenwood, 1978).

3.7.1.3 Historic

The project area became Mission land after the last of the people of Nocto and its neighboring villages were recruited to La Purisima in 1803. After Mission lands were secularized, the project area was within the northern part of the Rancho Punta de la Concepcion, called Rancho Espada. Rancho Espada became part of the Dibblee-Hollister holdings during the 1870s. In 1879, Robert Sudden began building a wharf near Point Arguello. He bought the Rancho Espada from W.W. Hollister in 1882, and moved the wharf 5 kilometers (3 miles) south. Various members of the Sudden family managed the ranch, which was used mostly for cattle and horse grazing, until the USAF acquired it in 1966. Oil exploration began in the project area in the early 1920s (Environmental Solutions Inc. 1990).

North VAFB began as Camp Cooke, an Army tank and artillery training area, in 1941 (Engineering Science 1994). The SLC-3 and SLC-4 portions of South VAFB were originally managed by the U.S. Navy. In 1957, the USAF acquired Camp Cooke, which became VAFB in 1958. From that time to the 1960s, the USAF acquired additional holdings in the southern portions, including the Sudden Ranch, until its present configuration was reached. Today, VAFB is the third largest Air Force base in the continental United States.

Since the USAF acquired the lands that comprise VAFB, their use related primarily to construction of missile launch and support facilities and the launching of space vehicles. Some of the earlier buildings from the Sudden Ranch developments have been removed, although several relatively modern complexes of buildings remain that are associated with other historic activities. One of these is a Coast Guard Rescue Station, known as the Boathouse, built at Boathouse Flats

between 1936 and 1938 (USAF 1983). Although deactivated in 1952, the station retains historical value as one of the few West Coast examples of the U.S. Colonial revival style of architecture.

3.7.2 Existing Resources

An archaeological site record and literature search was completed to gather information about previous studies and known cultural resources within the proposed project area. For the purposes of this EA, the Areas of Potential Effects (APEs) consist of the actual dock and harbor (for harbor improvements), a 492- by 164-foot area along the north side of the V-33 Tow Road and centered on the proposed EPT turnaround and an approximate 20,000-yard oval to the west northwest of the EPT turnaround. These locations are all shown in **Figure 2-3**. The record search indicated that all three APEs have been completely surveyed several times, and for this reason, no pedestrian survey was conducted. However, the proposed EPT turnaround location and the proposed temporary sediment storage area, as well as the dock and harbor, were visited briefly to evaluate potential impacts from the proposed project. The results of the record search are summarized below.

3.7.2.1 Record Search

The archaeological site record and literature search was conducted by Ms. Joyce Gerber at 30 CES/CEVPC, VAFB, California. This research included a review of literature, archaeological base maps, and cultural resource records. Previous archaeological studies within 1 mile of the APEs and archaeological sites within ¼ mile of the APEs were identified during the record search. Maps consulted at 30 CES/CEVPC included VAFB C-1 series (66 map set), the Base Comprehensive Plan, Geographical Information System (GIS), and U.S. Geological Survey topographic maps. A draft historical research document (Palmer, 1999a, b, and c), which provides specific information on the historic context of the area, was also reviewed. In addition, 30 CES-CEVPC personnel were consulted and information was accessed from the recent record search conducted at the Central Coast Information Center, University of California, Santa Barbara, by Boeing in support of the proposed EELV project.

The site record search indicated that at least 19 surveys or other cultural resource studies have been recorded within a 1-mile radius of the APEs (**Table 3-11**). The APEs have been completely surveyed previously. Five archaeological sites are recorded within ¼ mile of the APEs and three of these, CA-SBA-636, CA-SBA-1542, and CA-SBA-3547H, are within or adjacent to the APEs. The proposed project is also within the viewsheds of both the Sudden Ranch Historic District and the Anza Trail. These resources are described in the following sections to provide a context for the discussion of environmental consequences in Section 4.0 of this document.

Table 3-11
Surveys or Other Studies Recorded within One Mile of the Proposed Action

VAFB Report Reference No.	Author(s)	Report Title
VAFB-1978-01	Carrell, Toni L.	An Inter-Tidal and Underwater Archaeological Survey of the Point Arguello Boat House Area, VAFB, California
VAFB-1978-02	Craig, Steven and Michael Glassow	An Archaeological Survey and Statement of Significance for Cultural Resources Located in the Vicinity of Oil Well Canyon, VAFB, California
VAFB-1981-01	Glassow, Michael A. and Marcel Kornfeld	Archaeological Test Excavations at Sites in the Vicinity of Oil Well Canyon, VAFB, CA (Final Report Plus Appendix Under Separate Cover)
VAFB-1981-09	Greenwood, Roberta S. and John M. Foster	Range Improvement Project, VAFB, SBa Co, CA. Volumes I and II
VAFB-1983-10	Gibson, R.O. and B.J. Schuyler	Results of Archaeological Monitoring at SBa-1149-P in Connection with the GSSI Project at VAFB, CA
VAFB-1983-15	Spanne, Laurence W.	Report on Archaeological Survey of a Proposed Water Systems on Sudden Ranch Lease; VAFB, CA
VAFB-1984-03	Rudolph, Teresa P., Pandora Snethkamp, and Douglas B. Bamforth	Lithic Procurement and Manufacturing Sequences at SBA-1542, VAFB, CA
VAFB-1985-09	Martin Marietta Corporation	Environmental Surveillance Report, No. 20 October 1, 1984 through August 15, 1985.
VAFB-1985-15	Gibson, Robert O.	Results of Archaeological Monitoring and Limited Subsurface Testing for the V-23 Space Shuttle Launch Site Patrol Roads C and D, VAFB, CA
VAFB-1986-05	Martin Marietta Corporation	Environmental Surveillance Report, No. 21 August 15, 1985 through May 15, 1986. (Report is filed on separate shelf for surveillance reports)
VAFB-1988-06	Environmental Solutions, Inc.	Archaeological Resources Inventory and No Effects Determination for Proposed Geotechnical Testing.
VAFB-1988-07	Marmor, Jason	Results of Archaeological Monitoring of Geotechnical Exploration at the Proposed Space Launch Complex 7 (SLC 7) Project Area, VAFB
VAFB-1988-19	Environmental Solutions, Inc.	Archaeological Resources Inventory and No Effects Determination for Proposed Phase III Geotechnical Testing
VAFB-1990-15	Environmental Solutions, Inc.	The Survey and Inventory of Historic Properties Within the Titan IV/Centaur Launch Complex Study Area, VAFB, SBa Co, CA, Volume I
VAFB-1990-21	Glassow, Michael A. <i>et al.</i>	Archaeological Investigations on VAFB in Connection with the Development of Space Transportation System Facilities, Volume I
VAFB-1991-04	Schmidt, James J.	Standard Small Launch Vehicle (SSLV): Taurus Project VAFB.
VAFB-1998-03	Chambers Group, Inc.	Final Report, Phase I, II and III Archaeological Survey, Vandenberg AFB, California.
VAFB-1999-13	Harro, Douglas R. and Joyce L. Gerber	Archaeological Investigations for the Proposed Boeing Elevated Platform Transporter Turnaround Pad, VAFB, Santa Barbara County, California
VAFB-1999-14	Harro, Douglas R. and Joyce L. Gerber	Archaeological Investigations for the Proposed Boeing Company Modified Elevated Platform Transporter Pad, VAFB, Santa Barbara County, California

3.7.2.2 CA-SBA-636

CA-SBA-636 was recorded by Spanne¹¹ in 1970 and described at that time as an approximately 787 x 574-foot, light-density shell scatter with one retouched flake, lithic debitage, and glass, metal, and wood of recent origin. Faunal remains recorded were *Haliotis rufescens*, *H. cracherodii*, *Tegula* sp., *Chiton* sp., and *Mytilus* sp. Schmidt relocated the site in 1991. No subsurface testing has been conducted at the site and its National Register of Historic Places (NRHP) eligibility has not been evaluated.

3.7.2.3 CA-SBA-1542

CA-SBA-1542 was recorded in 1978 by Craig and Glassow as a dense concentration of utilized stone tools and lithic debris surrounding a partially exposed chert outcrop, covering approximately 200 by 400 feet. Subsurface testing conducted at the site in 1981 (Glassow and Kornfeld, 1981) indicated that the site was eligible for inclusion on the NRHP. Subsequent impacts to the site from construction of the paved missile Tow Road were mitigated by intensive surface collection and data recovery excavations including seven 1 by 1 meter units and four backhoe trenches (Social Process Research Institute, 1984). The excavations yielded flake densities near the chert outcrop ranging from 1,000 to 2,000 flakes per cubic meter. Only lithic reduction activities were represented in the deposits. The Sudden Flats terrace, which contains abundant outcrops of chert cobbles and boulders, is expected to hold sparse and widely scattered flaking debris, based on its geology and the previously documented archaeology of the region (Harro and Gerber, 1999a).

Excavations at CA-SBA-1542, which is centered on one such outcrop, were conducted in 1999 to define a location where significant cultural properties would not be adversely affected by the EPT turnaround. Testing began more than 45 meters west of the mapped site boundaries and yielded flaking debris, implying that the site extended farther west than previously thought. Additional units placed 40 and 80 meters west of the first units also proved positive. The turnaround was ultimately planned for the tested area where flake densities appeared to be lowest, the area farthest west from the site's core. Due to its low artifact density and heavy disturbance, this portion of the site does not hold the same qualities or data potentials that make the site significant, and the project was considered to have no adverse effect to CA-SBA-1542 (Harro and Gerber, 1999a,b).

3.7.2.4 CA-SBA-3547H (Point Arguello Coast Guard Lifeboat Rescue Station)

This 425- by 400-foot site is a former Coast Guard complex that operated from 1936 to 1952. Its west site boundary consists of the paved missile tow route, grazing land, and Boathouse Access

¹¹ Field forms on file in archaeological records archived at 30 CES/CEVPC.

Road; the south site boundary includes coastal bluffs that are bordered by a breakwater and tow route. The site's focal point is the 2½-story Colonial Revival Administration and Barracks Building 302. The complex is surrounded by a wood fence (Palmer, 1999a). In 1978, a NRHP nomination prepared for the site determined that the complex was significant for its architecture, engineering, and landscape architecture in a 1934-1938 period of significance (Palmer, 1999b). Historic Architectural Building Survey/Historic Architectural Engineering Record documentation of the site occurred in 1980, consistent with the terms of a Memorandum of Agreement between the Advisory Council and the Air Force, and the dock and boathouse were subsequently removed. The site was determined eligible by the Keeper of the National Register in 1990. In a recent discussion of the site's eligibility, Palmer states, "The Station overlooks a forty-mile expanse from Point Sal to Point Conception, with a particularly dramatic view of the undeveloped coastline...Cattle ranching still takes place here as it did when this area formed part of the Punta de la Concepcion land grant in 1837. The complex stands as a reminder of the role maritime affairs and the federal government played in the study area during the twentieth century" (Palmer, 1999b:166).

3.7.2.5 Anza Trail

The historic 1,200-mile Juan Bautista de Anza National Historic Trail is the route of Anza's 1775-1776, 240-person expedition from Tubac, Mexico to San Francisco, which culminated in the founding of the presidio and mission (Garate, 1993). Designated a National Historic Trail by Congress in 1990, the Anza Trail is a linear landscape resource that crosses the entire length of VAFB. Its general location is known from primary sources, such as the Font diary, which contain references to specific villages (now known archaeological sites) along the route. The closest Chumash village site mentioned in the diaries, which describe the Trail, is *Nocto*, located about 1.3 miles from the project area. Other than such sites, however, the Trail cannot be identified by visible features such as wagon ruts, but must be considered in terms of its landscape features as referenced in the historic journals. Based on available documents, and on the topography of the project area, it is likely that the proposed project is within the Anza Trail's viewshed (National Park Service, 1994).

3.7.2.6 Sudden Ranch Historic District

This area, which includes the Sudden Ranch Headquarters, extends along the coastal terrace approximately 6.6 miles from its western boundary at Canada Agua Viva, along the Coast Road to Long Horn Canyon on the east. In 1999, it was documented and evaluated as a district because of the linkages of the resources involved and in accordance with National Register Bulletin 30. It "represents the best-preserved nineteenth-twentieth century coastal ranch in Santa Barbara County. Its significance lies in its varied collection of buildings, ranch structures, agricultural land alterations and archaeological features that form the historic district. The contributing elements

include its deteriorating and collapsed structures, foundations, and equipment, and the long uninterrupted vistas enhance the feeling of the district” (Palmer, 1999b). The initial recommendation of the historic consultant who documented and evaluated the site is that the Ranch Headquarters and District constitute an NRHP-eligible property. The proposed project is within the viewshed of this resource.

3.8 Transportation

The general transportation system on VAFB is described in Section 3.4 of the FEIS. The major roads on South VAFB that would provide access to the harbor are SR 246, Arguello Boulevard, Bear Creek Road, and Coast Road (see **Figure 1-1**).

SR 246 is a two- to four-lane highway that runs from the foothills above Santa Barbara to the coast between North and South VAFB. Arguello Boulevard is a north-south, two-lane arterial road that intersects SR 246 roughly 1 mile from the coast. Bear Creek Road is a two-lane arterial that joins Arguello Boulevard and Coast Road roughly 5 miles from Highway 246. Coast Road is a two-lane undivided roadway that provides access to SLC-6. From SLC-6, Coast Road continues south for approximately 2 miles where it crosses a Southern Pacific railway. As shown on **Figure 1-1**, a Southern Pacific railway runs through North VAFB and South VAFB along a path that parallels the coastline. The paved road continues south past the railway for approximately ½ mile, where it terminates at the dock and harbor.

The half-mile section of road between the railway and the harbor is known as the V-33 Tow Road. However, access to the Tow Road south of the Southern Pacific railway crossing is tightly controlled by the railroad company. Thus, normal access to the harbor past this point is by way of a wide, single-lane farm road.

The level of service, i.e., the operational conditions of a road, has not been determined explicitly for most roads that vehicles would use to travel to the harbor. However, none of the roads are heavily traveled; most traffic occurs when personnel travel to or from SLC-3 and SLC-6 and the few other facilities along the Coast Road.

3.9 Geology and Soils

The general characteristics of the geological resources at VAFB are discussed in Section 3.8 of the FEIS. Sediments in the harbor are characterized as fine-grained sands overlying shale bedrock (ENSR 2000a). In some areas, apparently where the bedrock was deeper than the required dredge depth or bedrock was excavated to a greater depth, there occurs a finer silty-clay on top of the shale. Based on sediment core samples and jet probe investigations, the approximate depth of this finer material is between -15 to -18 feet MLLW (ENSR 2000a).

Harbor sediments were evaluated for chemical constituents in 1998 and 1999. Chemical constituents in sediment from most areas of the harbor were typical of background conditions from a nearby beach. However, sediment in two samples collected near the center of the harbor (roughly 200 feet from the dock) contained eight metals at concentrations elevated somewhat above background levels. Concentrations of arsenic, cadmium, chromium, copper, mercury, nickel, and zinc exceeded the Effects Range-Low (ER-L) screening benchmark developed by the National Oceanic and Atmospheric Administration's National Status and Trends Program (**Table 3-12**). Other samples contained inorganic and organic constituents at concentrations below either the ER-L or background levels¹². However, based on the ER-L exceedance of the eight metals in the two samples, as well as the relatively small amount of material to be dredged, CCC and USACE representatives determined the original plan for beach or ocean disposal of the sediments would not be appropriate. Instead, these representatives recommended upland disposal of the materials.

Table 3-12
Maximum Metal Concentrations in Harbor Sediment Samples

Maximum Metal Concentrations in Harbor Sediment Samples				
Metals	Concentration (mg/kg)			ER-L Value (mg/kg)
	Core 4 ≈ - 18 MLLW	Core 10 ≈ - 13 MLLW		
		Test	Retest	
Arsenic	16	12.2	13.5	8.2
Cadmium	4.5	9.6	10.0	1.2
Chromium	140	90.8	118	81
Copper	36	69.7	72.3	34
Mercury	0.12	ND	0.30	0.15
Nickel	180	95.2	101	20.9
Silver	0.03	1.64	2.07	1
Zinc	260	166	182	150
≈ - 18 MLLW = approximately 18 feet below MLLW ND = Not detected Mg/kg = milligrams per kilogram				

Despite the elevated metal concentrations, the metal-bearing sediment did not qualify as a California hazardous waste (ENSR 2000a). The sediment sample with the highest metal concentration was subjected to the Waste Extraction Test (WET) analysis, and it was determined that leachate from the metal-bearing sediment would not qualify as a California hazardous waste (ENSR 2000a). Based on the results of the WET test, the sediments would be suitable for construction fill material from an environmental standpoint.

¹² It should be noted that in September 1997, the area from which the background samples were collected was heavily oiled as a result of the Torch/Platform Irene oil spill. However, because the results of the survey did not reveal elevated levels of petroleum products in either the background or harbor samples, the conclusion that metal concentrations were above screening concentrations or background levels would have been unaffected by these results.

3.10 Utilities and Energy

The utility systems for VAFB in general are described in Section 3.5 of the FEIS. Utilities at the harbor consist of six pairs of 1,000-watt HPS lights, three on each side of the dock, a high voltage electrical transformer, and a fresh water spigot. The lights are mounted on poles approximately 50 feet high. Three pairs of lights face the ocean to illuminate the beach area while the balance of the lights shine on the dock itself. The fresh water spigot is connected to a garden hose that is used by military recreational users of the harbor area. Sport fishermen use the freshwater to clean their catch and surfers use the freshwater to rinse the seawater off themselves upon exiting the harbor waters.

No other utilities are available at the dock. Fresh water, electricity, phone service, and restroom facilities are available at the Boathouse buildings; however, these facilities are not routinely available for visitors at the dock. Presently, a portable toilet is located on the dock and is generally used by recreational users of the dock/harbor area. Contractors will supply their own facilities for use during the dredging/construction activities.

There are no utilities at the EPA turnaround, although there is a 12.47 Kv overhead power line crossing the site.

3.11 Health and Safety

Health and safety issues are addressed through a risk management framework consisting of regional and local elements that have been established to minimize or eliminate potential risk to the general public and on-site personnel as a result of VAFB operations.

Range Safety regulations at VAFB are contained in EWR 127-1, Range Safety Requirements (U.S. Air Force, 1995) and were summarized in Section 3.7 of the FEIS. The majority of these regulations apply specifically to launch operations and the transport of hazardous materials. For example, if a facility will be used to store, handle, or process ordnance items or propellants, an Explosive Quantity-Distance Site Plan would need to be prepared. Also, the transport of hazardous materials such as propellant, ordnance, chemicals, and payload components must conform to DOT regulations for shipment of hazardous substances.

Since the actions proposed in this EA do not involve the specific activities described in these requirements, the requirements do not directly apply to these proposed actions. However, because the harbor area is situated down-range from the launch facilities at VAFB, Range Operations must be given advanced notification prior to the onset of any extended harbor activity such as the Proposed Actions.

General Health and Safety concerns for workers who would be involved with the activities discussed in this EA are covered by general regulations promulgated by both the federal and California Occupational Safety and Health Administrations (OSHA).

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4.0 ENVIRONMENTAL CONSEQUENCES

This section discusses the potential environmental consequences associated with the Proposed Action, No-Action alternatives, and other alternatives presented in Section 2.0. Each subsection discusses a separate resource area and describes the potential impacts resulting from implementation of the Proposed Action. Mitigation measures are described, where applicable. The effects of implementation of the No Action alternative and the other identified alternatives are summarized as the final subsection of each section.

Actions that are required by law have been incorporated into the Proposed Action. Similarly, standard Best Management Practices (BMP) and standard construction practices have been incorporated into the Proposed Action. Where adverse impacts result from implementation of the Proposed Action or alternatives, including the No Action Alternative, mitigation measures are presented under each resource area.

It should be noted that implementation of the No Action alternative for dredging or vessel operations, i.e., the harbor is not dredged or the ship is not allowed to use the harbor, would likely result in the harbor not being used at all. Under this scenario, the other actions, dock modification, dolphin refurbishment, temporary sediment storage, or EPT turnaround, would not occur, and the impacts associated with these actions also would not occur.

4.1 Land Use

An impact would be considered significant if the project resulted in nonconformance with approved land use plans; conversion of prime agricultural land to other uses; a substantial decrease in its productivity; or conflict with environmental plans or goals, USAF regulations, permit requirements, or existing uses of the project area or other properties.

4.1.1 Harbor Dredging

The proposed harbor dredging would require a federal dredge permit issued by the USACE, as well as a lease of state lands from the CSLC. The Air Force submitted a dredge permit application to the USACE and a lease application to the CSLC for review, concurrent with public review of the EA. Dredging would be conducted in conformance with the USACE and CSLC permit and lease conditions. Because discussions with the USACE and CSLC have not been completed, the specific permit and lease conditions are not currently known. However, Boeing anticipates that the mitigation measures presented in this EA will serve as a starting point for these conditions.

Boeing will submit quarterly permit compliance reports to the VAFB, CSLC, and CCC environmental staffs. The first of these quarterly reports will identify the permit requirements imposed by the various federal and state agencies that have issued permits for the project. It will also identify the actions Boeing will take to comply with environmental laws and regulations. The quarterly reports will identify the main construction activities that have occurred during that quarter, document the measures that were employed to assure compliance with the permit conditions and legal requirements, and discuss problems that occurred during that time period.

As defined in the CZMP, federal activities in or affecting a coastal zone must be consistent with the CZMP. The proposed harbor dredging would require a coastal zone consistency determination from the CCC, which administers the CZMP. The USAF submitted a draft coastal zone consistency determination for the harbor dredging to the CCC for review and concurrence by the CCC. Information to address comments from the CCC staff has been incorporated into this EA.

USAF vessels do not visit or operate from the harbor on a regular basis. The harbor is a restricted area and is off limits to civilian boat traffic. Since 1989, vessels have reportedly entered the harbor on only two occasions (Schaffer 1999). On both occasions, the vessels delivered aerospace-related cargo to VAFB. Based on the low level of use of the harbor, dredging activities would not impact boat traffic within the harbor.

During dredging, the dock area would be used as a temporary staging area for dredging equipment, and as the location where dredged sediment would undergo dewatering prior to transport to the temporary staging area. During dredging activities, the harbor, including the dock area, would be closed to visitors planning to use this area for recreational purposes. The dock area is on a military base and is not open to the general public. Because the impacts would be short-term (three to five weeks) and there would be no long-term reduction in access to public facilities, closure of the dock would not be a significant impact.

Other than short-term closure of the harbor area to recreational purposes, no land use impacts are anticipated. Since these impacts are not significant, no mitigation measures are required.

Since impacts from the periodic redredging would be similar to but of a shorter duration (2½ weeks) than the original redredging, there will be no significant impacts to land use from the periodic redredging and no mitigation measures are required.

4.1.2 Temporary Sediment Storage

The use of the temporary sediment storage area would remove roughly 4½ acres from cattle grazing use for up to two years until the area is adequately revegetated. This area is small relative to the entire area available to the cattle, which is approximately 10,000 acres. The

disturbance would be temporary, with recovery expected once the revegetation plan has been implemented fully. Based on these considerations, impacts to land use would be insignificant and no mitigation measures are required. These activities would require a coastal zone consistency determination from the CCC.

4.1.3 Dock Modifications

Construction activities at the dock consist of modifying the surface of the dock to create a gently sloped ramp and adding lighting fixtures to the existing light poles. These activities would not involve closure of public beaches, because the dock is on a military base that is not open to the public-at-large. During construction activities, the dock area would be closed to visitors planning to use the dock area for recreational purposes.

Other than short-term closure (two to three weeks) of the dock area to recreational purposes, which would not be a significant impact, no other land use impacts are anticipated. Since these impacts are not significant, no mitigation measures are required. These activities would require a coastal zone consistency determination from the CCC and a lease of state lands from the CSLC.

4.1.4 Mooring Dolphin Refurbishment

Construction activities associated with refurbishment of the six mooring dolphins would be confined to operations from a barge that would service the mooring dolphins. No new land development activities would be performed. As mentioned in Section 4.1.1, there is no regular boat traffic within the harbor that would interfere with refurbishment activities; therefore, no land use impacts are anticipated and no mitigation measures are required. These activities would require a coastal zone consistency determination from the CCC and a lease of state lands from the CSLC.

4.1.5 EPT Turnaround Area

Activities associated with the construction of the EPT turnaround area would occur in an undeveloped area approximately 1,000 feet west of the harbor and adjacent to the existing paved road (V-33 Tow Road). These activities would require a coastal zone consistency determination from the CCC.

The proposed construction and utilization of the EPT turnaround area would not result in conversion of prime agricultural land or cause a significant decrease in land utilization, although it would represent a minor intensification of use in an area that includes existing paved roadway. The area south of the Southern Pacific railway (including the EPT turnaround area) is used for cattle grazing. However, the EPT turnaround area constitutes slightly over ½ acre and would not

significantly impact the area available for cattle grazing, which encompasses an area of over 10,000 acres.

Other than a minimal loss of grazing land and the minor intensification of use, which are not considered to be a significant impacts, no other land use impacts are anticipated. Since the impacts are not significant, no mitigation measures are required.

4.1.6 Vessel Operations

Operational activities at the harbor include activities associated with vessel maneuvering within the harbor, vessel mooring, vessel offloading, and crew activities. No impacts to land use on VAFB would be expected from vessel operations in the harbor. Temporary recreational impacts would occur during vessel operations, as the harbor and dock area would be closed to recreational visitors as long as the vessel is within the harbor. The vessel would remain in the harbor for as long as it takes to unload the vessel - a period estimated to be 24 to 48 hours. The Delta Mariner would be expected to visit the harbor a maximum of six times per year.

Other than short-term closure to recreational users of the harbor and dock area, which would not be a significant impact, no other land use impacts are anticipated. Since these impacts are not significant, no mitigation measures are required.

4.1.7 Alternatives

The following subsections discuss the impacts from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements for Land Use.

4.1.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment; therefore, no impacts to land use would occur.

4.1.7.2 Alternative Dredging Method

Using the alternative dredging method of suction dredging would require that Boeing secure a dredging permit from the USACE and a lease of state lands from the CSLC. As with the proposed dredging method, this alternative dredging method would require closure of the harbor to recreational users temporarily during the dredging activities (approximately three to five weeks). This temporary closure was deemed to be an insignificant impact since the harbor is not a public facility.

4.1.7.3 Limited Operational Time

Limiting the operational time of the ship in the harbor would result in a greater impact to land use, since the harbor would need to be closed to recreational users for a longer period of time. However, because the harbor is not a public facility, the increased closure is not expected to be a significant impact.

4.2 Air Quality

Impacts to air quality would be considered significant if they resulted in violation of an ambient air quality standard, contributed to an existing or projected air quality violation, exposed sensitive receptors to substantial pollutant concentrations, or were not in conformity with the California State Implementation Plan (SIP).

In general, impacts to air quality resources result from either exhaust emissions or fugitive dust emissions. The emissions of criteria pollutants from the equipment associated with the dredging, dock modifications, dolphin refurbishment, EPT turnaround construction, and Delta Mariner operations were evaluated in Section 4.10 of the SEIS. Calculations supporting these analyses are contained in Appendix S of the SEIS.

The SEIS also contained a Conformity Analysis that evaluated whether the action was in conformance with the SIP. The conclusion of the analysis was that the actions analyzed in the SEIS, including the actions discussed in detail in this EA, resulted in emissions that were not regionally significant and were below the *de minimus* threshold. The Conformity Analysis did not break out specific activities associated with the construction and operation of the harbor, aside from the dredge and tugs. However, because the overall project was demonstrated to be in conformance with the SIP, the far more limited activities within the harbor would also be in conformance with the SIP. The Conformity Analysis prepared for the SEIS is included as **Appendix D** of this EA.

As a result of that treatment, this EA focuses only on impacts related to the generation of PM₁₀ emissions. PM₁₀ formation could occur during handling activities for the dried sediment, EPT turnaround construction activities, and dock refurbishing. The dredging itself, mooring dolphin refurbishment activities, or vessel operations in the harbor are not expected to produce PM₁₀.

4.2.1 Harbor Dredging

PM₁₀ would not be generated during the actual harbor dredging because the sediments would be wet and not subject to fugitive dust formation. However, sediments placed on the docks could dry out if left unattended for several days, such as over a weekend. If the sediment contained substantive amounts of fine particles and if high winds were to occur, PM₁₀ could be formed.

Two factors combine to virtually eliminate the potential for the formation of PM₁₀. First, based on the proposed schedule for dredging 24-hours per day and space limitations on the dock, sediment would be transferred off the dock before it could dry out. Second, the sediment being dredged consists of fine sand with little or no silts or clays. Even if dry, the sediments would not have constituents that could form PM₁₀. Based on these considerations, no mitigation measures would be required for dredging.

While emissions for the redredging were not included in the SEIS air conformity analysis, these actions will be of short duration resulting in fewer emissions than from the initial redredging. Since the more extensive initial redredging did not result in significant air impacts, the more reduced periodic redredging would also not result in significant air impacts. Additionally, consistent with the absence of impacts to air quality from dust formation by the original redredging, the periodic redredging will result in insignificant dust formation as well. Based on these considerations, the periodic redredging will not result in a significant impact to air quality and no mitigation measures are required.

4.2.2 Temporary Sediment Storage

Once the sediments are deposited at the temporary staging area, PM₁₀ formation could occur during high winds, or during sediment handling as it is moved from the staging area to SLC-6 for use as fill if substantial amounts of silts or clays are being manipulated. However, as discussed in Section 4.2.1, sediment is primarily fine sand containing little or no silts or clays. In the absence of small particles to contribute to PM₁₀ formation, impacts should not occur. However, the dredging contractor will use standard construction practices to control dust, including the application of a binding agent (e.g., calcium lignosulfonate), if necessary. To ensure these practices are followed and PM₁₀ formation is minimized, the following mitigation measure will be implemented:

Mitigation Measure A1 – Visual PM₁₀ Monitoring

During periods that sediment is actually being deposited into or removed from the temporary sediment storage area or the EPT turn around (and for a period of two weeks after these activities have stopped), the site will be visually monitored daily for observable PM₁₀ formation. If visible PM₁₀ is being generated from the site, a binding agent will be applied to the area or other measures, approved by the VAFB, CSLC, and CCC environmental staffs will be implemented to minimize PM₁₀ formation to an acceptable level.

4.2.3 Dock Modifications

PM₁₀ emissions could also form during dock modification activities. However, standard construction practices, such as the application of water during concrete sawing or grinding, will be used to control dust generation. Impacts that would occur would be expected to be small, with little dust being generated, and short-term, lasting for 2 to 3 weeks. Based on these factors no significant impacts will occur and no mitigation measures are required.

4.2.4 Mooring Dolphin Refurbishment

Dolphin-refurbishing activities are not expected to produce PM₁₀. Therefore, no mitigation measures are required.

4.2.5 EPT Turnaround Area

Impacts from EPT turnaround construction activities would be limited to PM₁₀ formation during handling of the fill material and site grading. Impacts would be minimal and similar to those discussed in Section 4.2.2. Standard construction practices, including the application of a binding agent as a dust control measure, if necessary, would minimize the amount of PM₁₀ emissions during construction activities to a level of insignificance. Also, the impacts would be short term (eight weeks). For these reasons, impacts would be insignificant and no mitigation measures are required.

4.2.6 Vessel Operations

Vessel operations are not expected to produce PM₁₀ or otherwise affect air quality beyond the impact evaluation presented in the air quality analysis in Section 4.10 and Appendix S of the SEIS. Therefore, no mitigation measures are required.

4.2.7 Alternatives

The following subsections discuss the potential air quality impacts from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements.

4.2.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment; therefore, no impacts to air quality would occur.

4.2.7.2 Alternative Dredging Method

Implementing the alternative dredging method would not yield the formation of PM₁₀ unless the sediments were left to dry out prior to their movement to the temporary storage area, the sediments contained a substantial percentage of silts and clays and high winds were to occur. Since the sediments contain few silts and clays and they would be on a dock for a minimal amount of time the impacts to air quality would not occur from the alternative dredging method and no mitigation measures are required.

4.2.7.3 Limited Operational Time

Limiting the operational time of the ship in the harbor to daylight hours would not result in differences in impacts to air quality from those presented in the Air Quality Analysis in the SEIS. The additional few hours that would be necessitated by the implementation of this alternative were already included in the SEIS Air Quality analysis. The additional operational time would not be expected to result in the formation of PM₁₀.

4.3 Water Resources

An impact to water resources would be considered significant if it interfered with drainage, caused a shortage in the VAFB supply system, or resulted in degradation of surface water quality such that existing uses would be impaired.

Impacts to water quality could result from discharge of water from sediment dewatering, from runoff from sediment piles, or from spills of materials into the water.

4.3.1 Harbor Dredging

Harbor dredging could result in water quality impacts in three ways: increases in turbidity from escaping sediments, elevation in concentrations of dissolved constituents above unacceptable levels, and spillage of fuels, lubricants, or other fuels.

4.3.1.1 Turbidity

During dredging, sediment would be stirred up and some would be lost from the dredge. Because the sediments are fine sands with few or no clays or silts, they should settle quickly to the bottom producing relatively little turbidity.

Turbidity associated with the original dredging was observed up to a mile down the coast to the south and a shorter distance west and north (Chambers Group, 1986). However, when dredging ceased for a few days, the water quality rapidly improved. The original dredging required blasting

and removal of both sand and rocky substrate. In addition, the Air Force constructed a cofferdam roughly 300 feet long in the middle of the harbor to allow for the construction of the dock and the dolphins under dry conditions. This construction and dredging activity generated considerably more turbidity than would occur under the current proposed actions. The area to be dredged is now comprised of fine sand with little clay or silt, the removal of which would produce far less turbidity than did the original construction and dredging. It is also worth noting that winter storms stir up substantial turbidity within the harbor but this turbidity dissipates within a day or two after the storm waves subside.

The Chambers Group (1986) completed surveys of biotic resources before and after the original dredging of the harbor. There were no changes in biota outside the dredge footprint despite the increase in turbidity that occurred during the dredging. Based on the following lines of evidence, the increase in turbidity that may occur as a result of the dredging would not cause a significant impact to water quality. This evidence includes:

- Fine sands will be dredged, which will settle quickly.
- Elevated turbidity levels resulting from high waves during storms is common and the biota in this area are expected to be well adapted to these naturally occurring elevated turbidity levels.
- There were no observed changes in the surrounding biotic community after the original dredging, which was substantially more invasive than would be the redredging.

Based on this evidence, the dredging is not expected to result in significant levels of turbidity. This insignificant impact notwithstanding, in order to minimize impacts from turbidity, Boeing's dredging contractor will comply with the following mitigation measure:

Mitigation Measure W1 – Turbidity Control during Dredging

Turbidity during dredging will be controlled by placing a turbidity curtain between the mooring dolphins and the kelp bed or around the dredge itself.

Sediments brought onto the dock or placed onboard the materials barge would quickly dewater. To ensure that water returning to the harbor following sediment dewatering does not contribute to a marked increase in turbidity, the following mitigation measure will be implemented:

Mitigation Measure W2 – Turbidity Control During Sediment Dewatering

The water from sediments deposited into the dock dewatering system will be captured by the collection system. Suspended material will be allowed to settle out and the water will flow back to the ocean by gravity through a pipe at the face of the dock emptying below

the water level. This system will be monitored visually to ensure that turbid water is not returned to the harbor. Compliance with this measure will be documented by the construction contractor on a daily log.

With implementation of this approach, turbidity is expected to be minimal and no greater than commonly occurs in the harbor during a typical winter storm. Thus, this impact would be maintained at an insignificant level.

4.3.1.2 Dissolved Constituents

Harbor sediments were evaluated for chemical constituents during sampling events performed in 1998 and 1999 (ENSR 2000). As discussed in Section 3.9, chemical constituents in sediment from most areas of the harbor were typical of background conditions. However, sediment in two samples from the center of the harbor contained several metals at concentrations that were slightly elevated above background levels. While the concentrations of eight metals exceeded the ER-L screening benchmark, the sediments would not be a California hazardous waste, based on the results of the WET test (ENSR 2000). The WET test was conducted using citric acid, which has a pH of approximately four. Seawater typically has a pH between 7.8 and 8.2, which is considerably less able to leach metals from the sediments.

While the WET test yielded information to determine if the sediments would be classified as a hazardous waste, the results shed little light on the likely concentration of metals in the interstitial water, which would drain from the sediments during dewatering. Therefore, a sample of interstitial water was also analyzed for metals content.

The results of the interstitial water testing demonstrated that neither dissolved nor total (dissolved plus particulate) metals concentrations are expected to exceed the thresholds in the Ocean Plan (SWRCB 1997). Thus, if some of the sediments or water derived from the sediments were to reenter the harbor, there should be no impact to the water quality in the harbor from elevated metals. However, Boeing will be complying with the conditions of the General NPDES permit granted to the State of California for a low-threat discharge to surface water. To fulfill the requirements of the permit, Boeing will collect the interstitial water and test it for metals. Testing will be performed prior to the initial discharge of the interstitial water and weekly thereafter for the duration of the dredging. Before this water will be released back to the ocean, it will be verified that the metals concentration will be below the limits set for these constituents in the 1997 California Ocean Plan. In the event that the water exceeds these limits, it will be treated by additional filtration to remove fine particulate material. If this water still exceeds the limits for discharge of these constituents, Boeing will transfer the water to tank trucks and dispose of it off base at a permitted facility. To ensure that the dredging can proceed at a pace minimally restricted by the limited water storage capacity, Boeing will establish contracts with local haulers

permitted for removing the water. Based on the existing data on metals in interstitial water of harbor sediment, impacts to water quality are not expected to occur.

Boeing will prepare and submit for review and approval by VAFB, CSLC, and CCC staff a WQMP for sediment handling and dewatering activities. This plan will address issues of both turbidity and metals concentrations associated with water removed from the dredged sediments. A draft WQMP is included in **Appendix C**.

4.3.1.3 Spills

Fuel spills might occur if an accident were to occur during refueling of the equipment, particularly the barge-mounted crane. To minimize the potential for this to occur, the dredge contractor will implement BMP for preparing for and managing spills. These BMPs include:

- no refueling of equipment will occur within 100 feet of the water;
- refueling will occur only in a designated refueling area; and
- the refueling area will be bermed or otherwise protected to prevent outflow of fuel contaminated runoff.

For the barge-mounted crane, rather than use a refueling vessel and pump fuel over the water, the 500-gallon fuel tank for the dredge will be removed from the dredge barge and filled on shore, at least 100 feet from the water, and at a site that is designed to capture run-off and spilled fuel using secondary containment. Once filled, the tank will be returned to the barge and reconnected to the dredge. To further protect the water from a fuel spill, the dredge barge will be surrounded by an oil boom at all times that it is operating within the harbor.

In addition, proper operating procedures will be utilized during refueling activities. These include: verifying the amount of fuel required for transfer; verifying there are no kinks in the hose prior to delivering fuel; ensuring that lines are firmly attached before refueling begins; checking for leaks during fuel delivery and stopping to correct any leaks before progressing; stopping the delivery of fuel at a minimum of 3 inches below the top of the tank, and; stopping pump prior to removing hose (for nozzle delivery), or draining hose and flange end before moving hose to another location (for flange-connected hose), and positioning individuals at both the fuel tank or vehicle and the fuel reserve to monitor the transfer.

In the event that a spill were to occur, the dredging contractor would undertake spill response measures called out in their Oil Spill Response Plan (OSRP) that will be maintained on-site at all times. Measures that are in the OSRP include procedures to identify and control the discharge, assess the magnitude of the spill, notify the appropriate authorities, initiate immediate response, and begin a spill clean up. In support of the spill clean up, spill clean-up materials will be

maintained at the refueling area and on the dredge barge. Materials that will be maintained on site to deal with a spill of fuel onto the barge or on land will include, at a minimum, absorbent grit ("kitty litter"), absorbent pads, large plastic storage bags, gloves, a receptacle for storage of soiled materials, and a rake or shovel to pick up soiled grit and pads.

To cleanup spills to the water, the dredge barge will carry a containment boom and absorbent pads that are specifically designed to absorb petroleum products more readily than water. Spills that occur during the transfer of fuel from the 500-gallon tank to the crane would be contained on the barge deck to the extent possible. Any fuel that escapes the containment area into the water would be contained within the boom surrounding the dredge, and absorbent pads would be used to pick up as much of the fuel as possible. Remaining oil floating on the surface water within the containment boom would be pumped into the onboard tanks, where it would be skimmed or separated out for proper disposal.

Because the dredging contractor has not been identified at the time of the publication of this EA, this site-specific spill plan has not been completed. Upon completion of this plan and before the initiation of dredging, the spill response plan will be provided to the VAFB, CSLC, and CCC environmental staffs for review and approval. Dredging will not occur until the plan has been determined to be adequate by all three agencies. A draft OSRP has been included in **Appendix C**. With the implementation of these actions, the potential for and impacts from a fuel spill are expected to be insignificant.

The periodic redredging of the harbor will be carried out following the same water quality protection measures as apply to the initial redredging. Based on this factor, there will be no impacts to water quality from the periodic redredging of the harbor.

4.3.2 Temporary Sediment Storage

Sediment stored at the temporary sediment storage areas would be comprised of fine sand with little clay material. The pile would be surrounded on the downslope side by a silt fence. This fence would prevent runoff from the sediment piles from moving into the harbor. In addition, Boeing will institute the provisions of their SWPPP at this site. The SWPPP contains the following provisions:

- install interim erosion and sedimentation controls consisting of hay/straw bales or silt fence;
- monitor the site for runoff problem areas and control problem areas with the placement of additional hay/straw bales or silt fence;

- implement Best Management Practices governing Vehicle and Equipment Fueling and Vehicle Equipment Maintenance to prevent fuel and oil spills and leaks, and to reduce their impact on stormwater. These practices include:
 - use of drip pans at equipment parking areas;
 - management of petroleum, oil, and lubricant storage areas;
 - maintaining vehicles in good working order, i.e., no leaks; and
 - disposing of wastes properly.

A draft SWPPP is included in **Appendix C**.

To minimize dust formation, calcium lignosulfonate or a similar nontoxic dust control agent would be applied to the sediment pile. Because this material is water-soluble and comprised of nontoxic materials, if any of it runs off and reaches the ocean, there would be no impact to water quality.

The sediments placed in the temporary sediment storage area will have dewatered but will still be damp. A minimal amount of water may seep from the sediment although the volume of water being released is not expected to be enough to result in a surface expression of the water, nor is it expected to migrate a sufficient distance downward to affect ground water. Groundwater depths at this location range from 55 to 75 feet bgs.

With the implementation of the provisions of the SWPPP, impacts to water quality from the use of the temporary sediment storage area will be insignificant and no separate mitigation measures are required.

4.3.3 Dock Modifications

Impacts to the harbor waters could result during concrete and asphalt removal if materials were allowed to drop into the harbor. To prevent debris from getting into the harbor waters, the construction contractor will institute the following practices:

- placing a fabric net around the edge of the work area to catch dust and debris;
- pulling material away from the dock face as is it loosened;
- temporarily storing debris toward the middle of the dock, well away from the water; and
- placing a sediment turbidity curtain in front of the dock to minimize the spread of turbidity.

In addition, Boeing will institute the provisions of their SWPPP for this site as discussed in Section 4.3.2.

Given the dynamic nature of the sediment in this area, the routinely high turbidity levels occurring naturally at the site, and the likelihood that the biota has adapted to these elevated turbidity levels, turbidity resulting from runoff from the dock activities will not be at a significant level. With the use of the standard runoff control and turbidity retention measures, the impacts would be reduced even further.

4.3.4 Mooring Dolphin Refurbishment

Dolphin refurbishment would involve no vessel refueling activities in the harbor. Furthermore, the refurbishment is not expected to result in turbidity or runoff into the harbor. As a result, no impacts to water resources would be expected, and no mitigation measures are required.

4.3.5 EPT Turnaround Area

Construction activities involving the EPT turnaround area would be required to use best management practices for erosion control. The construction contractor would implement Boeing's SWPPP prior to starting and during construction.

Standard construction practices, such as installation of a silt fence around the construction area to minimize the offsite transport of soil, would reduce the impact caused by potential surface water runoff into the harbor waters. With the implementation of these actions, impacts from runoff would be insignificant.

Groundwater depths at the proposed project location range from 55 to 75 feet bgs. Construction activities associated with the EPT turnaround would consist of standard earthmoving activities and pavement installation. These activities would not adversely impact groundwater quality. As a result, no impact to groundwater or surface water quality would be expected as a result of construction or use of the EPT turnaround area. Construction activities would not interfere with IRP sites because there are no IRP sites on or adjacent to the proposed location for the EPT turnaround area.

Impacts from operations within the EPT turnaround area would be minimal. The paved surface would not absorb rainfall, which would be directed to the side of the V-33 Tow Road. The relatively small surface area should not result in a substantial amount of water being directed to the road edge.

The EPT would be refueled at SLC-6, not at the turnaround area or dock. The EPT carries up to 135 gallons of diesel fuel and 400 gallons of hydraulic fluid. The hydraulic lines have a unique safety feature, whereby, if the pressure sensors detect a drop in pressure (i.e., due to a system leak), the flow to that system is shut down, minimizing potential spill volumes. In the event of a fuel leak, the spill would be contained and cleaned with absorbent materials by Boeing Operations

personnel. Boeing would retain a spill clean-up kit at the dock, as well as at the EPT turnaround. If a spill of over 50 gallons were to occur, the VAFB Fire Department would be called for emergency response, and the 30th Wing Environmental Compliance Group would receive written notification of spills of any size at this location. Boeing's spill response plan and response resources are described in more detail in Section 4.3.6.

Based on the low potential for spills of materials or runoff from the site and the implementation of the BMP outlined above, the proposed action would not significantly impact water resources.

4.3.6 Vessel Operations

Impacts to the harbor waters as a result of vessel operations might consist of spilled lubricants or fuels associated with an accidental release from the ship. While the vessel is in the harbor, spill prevention measures will be in effect. These measures will include immediately reporting and cleaning up spilled fluids, maintaining an adequate supply of absorbent materials and storage/disposal containers, and maintaining equipment in proper repair.

The Delta Mariner has been designed to minimize the potential for accidental spills. The fuel tanks are separated from the hull so that a rupture of the hull would not necessarily result in a fuel leak. The vessel will arrive at the harbor with its fuel tank approximately 1/3 full (approximately 30,000 gallons), and will not refuel within the VAFB harbor. Further, as a new vessel, its equipment is new and state-of-the art, compliant with all applicable environmental laws. In addition the Delta Mariner is a maximally maneuverable vessel with dual, fully rotating stern thrusters and dual bow thrusters. As a major shipper along the West Coast of the U.S., Foss has very experienced masters and crews familiar with both the vessels and the local operating conditions. Based on all these considerations, the potential for a spill occurring is minimal.

In the event of a spill into the water, all necessary manpower, equipment and materials would be committed to the expeditious control and removal of the spill. All spills into the water would be reported as required under Federal (33 CFR 151.15) and State (Section 25507 HSC) laws. The Delta Mariner currently has a Shipboard Oil Pollution Emergency Plan that has been approved by the U.S. Coast Guard (USCG). Prior to operation in California waters, Foss, the operator of the vessel, would submit an oil spill contingency plan to the California Department of Fish and Game Office of Spill Prevention and Response (OSPR) for review and concurrence.

Boeing will submit to the VAFB, CSLC, and CCC environmental staffs documentation that the vessel operator's Oil Spill Contingency Plan meets USCG's and OSPR's requirements for such plans prior to the arrival of that vessel. No vessel will be allowed to enter the harbor until it has submitted to VAFB documentation that it has an approved spill plan.

With the implementation of these standard operational measures, potential impacts to water resources from the operation of Boeing EELV related vessels would be insignificant.

Prior to loading and unloading operations at the harbor, Boeing would finalize a spill plan to respond to spills into the harbor related to off-loading operations. A draft spill plan is provided in **Appendix C**.

While Boeing would be prepared for minor spills into the harbor, a major event would be deferred to the USCG. Boeing will contact the USCG and the VAFB Fire Department prior to the arrival of the first ship at the harbor to discuss procedures to be followed in the event of a major emergency in the harbor area. Boeing or its contractors would bear the cost of a cleanup and response carried out either by the 30th Space Wing or the USCG.

It also should be noted that there would be a slight increase in localized turbidity from vessel propellers each time a large vessel enters and leaves the harbor. The facts that the vessel will be travelling at low speed, will make a maximum of six ship calls a year, and that turbidity is a common natural phenomenon in this area render this an insignificant impact that does not require mitigation.

4.3.7 Alternatives

The following subsections discuss water resources impacts from the No Action alternative, alternative dredging method, and limited vessel operation time alternative for the six project elements.

4.3.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment, and therefore no significant impacts to water resources would occur.

4.3.7.2 Alternative Dredging Method

Implementation of suction dredging would require the use of seawater to transport the suspended sediment to the onshore dewatering area. Turbidity of the harbor waters at the dredge head would be less than that generated by clamshell dredging, because most of the suspended sediments would be sucked up and transported to the dewatering area. Because there would be minimal loss of sediment from the dredge head, it is assumed that the turbidity would be at an insignificant level.

The larger volume of seawater that would be generated and released back into the harbor from the dewatering area could result in higher turbidity in the discharge water, if it were not allowed to

settle fully. Because of the larger amount of seawater that would be captured on the dock dewatering area, the use of suction dredging would necessitate a larger and more complex settling pond arrangement. In addition, there would likely be the need for a more comprehensive turbidity management plan that could include the use of such measures as sediment traps, particulate water filters, and similar particulate control measures. A draft WQMP for the proposed dredging method is provided in **Appendix C**. If the suction dredging method were selected, the dredging contractor would revise the WQMP to discuss how turbidity would be controlled and minimized. The plan would be submitted to the VAFB, CSLC, and CCC environmental staffs for review and concurrence that turbidity would be controlled to a level of insignificance.

4.3.7.3 Limited Operational Time

Limiting the operational time of the vessel to daylight hours would increase the total duration that the vessel is in the harbor. The presence of the ship in the harbor would yield the potential for the spilling of lubricants and fuels into the harbor water. However, with the implementation of the required spill prevention measures discussed in Section 4.3.6, this potential impact would be at an insignificant level.

4.4 Noise

Noise impacts would be considered significant if the project substantially increased the ambient noise levels for adjoining areas with noise-sensitive uses. Impacts of noise to humans are considered in this section. Impacts of noise on wildlife are discussed in Section 4.5.

4.4.1 Proposed Actions

There are no sensitive human receptors within one mile of the project area, and the area is not open to the general public. Operation of heavy equipment would generate noise during dredging, sediment storage, dock modification, dolphin refurbishment, EPT turnaround construction, and vessel operation. However, the noise level would be kept within limits required by OSHA to protect the workers. In situations where loud noises are unavoidable, workers would be required to use hearing protection, in accordance with the health and safety plan discussed in Section 4.11. Therefore, noise impacts to humans for all six project elements would be insignificant, and mitigation would not be required.

4.4.2 Alternatives

The following subsections evaluate the No Action alternative for all six project elements, as well as the alternate dredging method and the limited ship operational time alternative.

4.4.2.1 No Action Alternative

Implementing the No Action alternative would not alter the existing environment, and therefore no significant impacts to noise-sensitive resources would occur.

4.4.2.2 Alternative Dredging Method

Noise from the use of suction dredging would be kept within OSHA limits. Workers would be required to use hearing protection, in accordance with the health and safety plan discussed in Section 4.11. Therefore, noise from the alternative dredging method would not result in impacts to humans.

4.4.2.3 Limited Operational Time

Vessel operations will generate noise, but noise will be kept within required limits. Workers would be required to use hearing protection, in accordance with the health and safety plan discussed in Section 4.11. Therefore limiting operating time would not result in impacts to humans.

4.5 Biological Resources

Significant adverse impacts to biological resources would occur if special-status species or their habitats were substantially affected by project-related activities. Impacts would also be considered significant if the habitat essential to fish species for which a Fisheries Management Plan has been prepared were to be substantially affected.

Impacts from construction could occur during harbor dredging, temporary sediment storage, dock modification, dolphin refurbishment, or EPT turnaround construction. These impacts would be short term (weeks to months). Impacts from operations could occur as a result of the use of the harbor and EPT turnaround area during the vessel operations. These impacts would be sporadic, occurring up to six times per year, and for durations up to 48 hours.

4.5.1 Harbor Dredging

Dredging impacts to biological resources could result directly from substrate removal during the dredging or indirectly from increased turbidity fouling the gills of sensitive animals or reducing the available light to plants. Algae and sessile invertebrates within the dredge footprint would be lost but, due to the large populations of these organisms in the surrounding areas, impacts would be insignificant. Fishes and mobile invertebrates would likely leave the area during dredging, but would return when dredging is completed. There is little stable rock that is exposed within the dredge footprint. Therefore, abalone would not lose habitat. Spiny lobster would not lose habitat because no ledges or crevices that provide shelter for lobster occur within the dredge footprint. In

addition, the noise from the dredging could affect mobile animals, causing them to temporarily or permanently abandon the site.

The size of the dredging area is dictated by the size and maneuvering requirements (and maneuverability) of the Delta Mariner. The Delta Mariner is 292 feet long and highly maneuverable because of its bow and stern thrusters. In order to ensure the minimum impacts from dredging activities, Boeing required the Delta Mariner's owner (Foss Maritime) to define the minimum area needed for the vessel to be able to safely approach, dock, unload, and depart. These minimum requirements for safe operation were the basis for defining the dimensions of the area to be dredged.

4.5.1.1 Kelp

The proposed dredging would remove the kelp within the proposed dredge footprint. Approximately 0.2 acre of kelp canopy within the dredge footprint would be lost. This kelp represents less than one percent of the kelp near the harbor area.

It is not known how much cobble would be present within the dredge footprint when dredging is completed. The approximately one acre of cobble habitat at the offshore end of the proposed dredge footprint might be removed by the dredge. On the other hand, dredging might expose rock and cobble habitat that is presently buried by sand.

After the completion of dredging, *Macrocystis* and other species of algae would be expected to recolonize the area where cobble or rock are present within the dredge footprint. Because *Macrocystis* recruitment is irregular, it is uncertain how long recolonization would take. Because of the presence of kelp in the immediately surrounding area, it is likely that the dredge footprint would be revegetated with kelp within one year. Proposed vessel operations within the dredge footprint may prevent kelp from becoming re-established in the dredged area because of propeller damage to kelp plants. Periodic maintenance dredging will also prevent the kelp within the dredge footprint from becoming re-established on a long-term basis.

The presence of kelp within the dredge footprint increases the value of the area to a variety of fish species that are associated with reef habitat. Because the kelp habitat within the dredge footprint occurs in small patches, and because the kelp is at relatively low density and is not associated with a stable reef structure, the habitat within the dredge footprint has less value than the reef between the dolphins and the breakwater, and the rocky habitat north of the dredge footprint. To compensate for the loss of this resource, Boeing will institute the following mitigation measures:

Mitigation Measure B1 – Kelp Restoration

Boeing will develop and institute the provisions of a kelp restoration program. This restoration program will identify the number of kelp plants lost due to dredging, the location

the replanting will occur, the success criteria against which the restoration will be measured, and the remedies for failure to meet these criteria. Based on the success of the kelp growing on the artificial reef inside the breakwater, one strategy to encourage kelp restoration would be to add more structure to this reef. Alternatively, if other areas near the harbor are identified as good candidates for kelp restoration through the placement of boulders, these sites will be considered. If an artificial reef is manufactured, recruitment of kelp to the reef will be monitored on a schedule spelled out in the restoration plan. The mitigation will include sufficient kelp replacement to account for kelp lost during subsequent dredging.

A draft kelp mitigation plan is included in **Appendix C**.

With the implementation of the kelp restoration plan, there will be no significant impacts to kelp from either the initial or subsequent dredging.

The kelp bed between the breakwater and the mooring dolphins would be subject to some turbidity from the dredging. A high density of large, adult plants with an extensive surface canopy of up to roughly ½ acre (**Figure 3-1**) occurs in that area. These plants with fronds that reach the surface would not be sensitive to sedimentation or reduced light in the water column. However, turbidity could affect recruitment and the growth of juvenile kelp plants. Dean and Deysher (1983) have noted that kelp recruitment occurs in relatively rare recruitment windows. If excessive turbidity from dredging occurred in adjacent areas during one of the rare recruiting periods, light levels could be reduced to a point where conditions for recruitment were rendered unfavorable. In this case, a brief pulse of turbidity with essentially no effect on adult *Macrocystis* plants could significantly alter the long-term dynamics of the kelp bed and the kelp community.

Because the dredging will occur for a short period of time, not directly affect these plants, and not likely result in indirect impacts to these plants, and because Boeing will implement **Mitigation Measure W1**, impacts to kelp between the breakwater and the docking dolphins will not be significant. In addition, because the other organisms associated with this reef habitat are adapted to the naturally occurring occasional high turbidity levels, the turbidity generated by the dredging is not expected to affect this community. In the absence of adverse impacts, no mitigation measures are required

4.5.1.2 Benthic Organisms

The habitat adjacent to the dredge area could be affected by turbidity from the dredging. Turbidity can have a number of negative effects on benthic organisms. Mechanical or abrasive action of suspended silt and detritus can negatively impact filter-feeding organisms by clogging their gills and impairing both proper respiratory and excretory functioning and feeding activity. Suspended

sediments can also bury sedentary organisms. **Mitigation Measures W1 and W2** to minimize turbidity are presented in Section 4.3.1. The intertidal and shallow subtidal communities of the harbor area are adapted to large seasonal sand movements and periods of considerable natural turbidity. For example, during the 1978/1979 baseline survey of the harbor area (Chambers Group, 1980), underwater visibility throughout the area was generally only a few feet, and on one occasion, divers observed complete blackness during the middle of the day at a water depth of 25 feet. Large amounts of seasonal sand movement were noted on the transects during that study. Therefore, subtidal organisms in the areas surrounding the dredge footprint are unlikely to be particularly sensitive to turbidity.

The harbor area was surveyed in 1984 immediately following the original harbor construction (Chambers Group 1984). The benthic community adjacent to the dredge footprint was found to be similar to that present in the area before construction. Diversity of algae was slightly lower than before construction, but the change was within natural variability. The habitat itself was not altered except within the dredging footprint.

A large intertidal population of black abalone (*Haliotis cracherodii*) had been observed on the west side of the breakwater and a few abalone were observed on reefs offshore of the breakwater (Chambers Consultants and Planners, 1980). These areas are on the side of the breakwater opposite the proposed dredging or are well away from the proposed dredging. Abalone are rare in the harbor area, and no abalone were observed during the 2000 survey (Chambers Group, 2000).

If the dredging were to result in large amounts of silt reaching these habitats outside the harbor, some impacts to abalone might occur. Burge and Schultz (1973) reported that mud associated with construction at Diablo Cove clogged the gills of abalone. However, the sediment to be dredged within the harbor embayment is predominantly sand, which is expected to settle rapidly and produce little turbidity. Therefore, it is unlikely that substantial amounts of silt or fine sediment could reach abalone. As noted above, turbidity in the harbor area can be quite high due to natural events such as storms. As a consequence, animals living within the harbor are expected to be tolerant of this occasional high turbidity. Thus, even if some turbidity resulting from the dredging were to reach habitats where abalone or other animals occur, impacts would be insignificant and no mitigation measures are required.

Impacts from the maintenance redredging would be similar to but of a shorter duration and of a smaller magnitude than that of the initial redredging. As a result impacts to benthic organisms would be insignificant.

4.5.1.3 Noise and Activity Impacts

Dredging of the harbor involves considerable activity and the use of noisy, heavy equipment. The noise levels expected from the dredging and other construction equipment, as well as the background noise measured at the dock area, are presented in **Table 4-1**. In simple terms, noise intensity decreases in inverse proportion to the square of the distance from the source. A dredging crane at the edge of the dock producing 88 dBA of noise would still be quite noisy, (approximately 74 dBA), at the nearest beach or the end of the breakwater, roughly 250 feet away. Thus, if a seal were hauled out on the beach or pelican were sitting on the end of the breakwater, it is likely that they could hear the dredge quite clearly.

Table 4-1
Noise Levels of Heavy Construction Equipment

Type of Equipment	Range of Typical Noise Levels (dBA) at 50 feet	Range of Maximum Noise Level (dBA) at 250 feet
Backhoe	84-93	70-79
Water Truck (3,000 gallons)	81-84	67-70
Clamshell dredge	75-88	61-74
Roll-off truck transporter	82-95	68-81
EPT	56-82*	43-68
Ambient background noise at the harbor	35-48**	
* Noise level measured within 20 feet from the engine exhaust (Acentech 1998).		
** Noise level measured at the dock by Acentech (1998) approximately 250 feet from the beach.		
Source of Noise Levels: Acentech 1998; EPA 1971.		

A considerable amount of human activity is also associated with the dredging, as well as the other construction. It is likely that mobile animals, such as harbor seals, sea otters, or pelicans, would be disturbed both by the human activities and the noises associated with those activities and would avoid the area.

The harbor area is used by a wide diversity of wildlife species for resting and foraging, including some special-status species such as southern sea otters and California brown pelicans. However, no marine birds or mammals and very few terrestrial species, none of which are special-status species, breed in the area. Harbor seals do occasionally haul out on the beach west of the harbor and the eastern end of the beach is within roughly 250 feet of the dock. Based on these considerations, noise levels at the dock and within the harbor could increase temporarily such that noise sensitive wildlife would leave the area. However, this would be a short-term impact and would not significantly impact wildlife (Naue, 2000, Harris, 2000). Wildlife would be expected to return to the project areas when construction activities cease. The NMFS has reviewed the

project and determined any disturbance is likely to be minimal and insignificant (Lent 2001). They indicated that they did not recommend that the Air Force apply for an Incidental Harassment Authorization. However they did recommend that if any portion of the project caused the seals to flush that portion of the project should be delayed until the animals have left the area. As a result, Boeing will institute the following mitigation measure:

Mitigation Measure B2 - Seal Monitoring

Boeing will have a qualified individual monitor the seals on the rocks and beach nearest the harbor to determine if any are flushed as a result of the activities in the harbor. If the seals flush for this reason, that portion of the project that caused the seals to flush will be delayed until the animals leave the area.

Dredging-related activities are expected to last less than three weeks, but could last up to five weeks, including set-up and tear-down activities both in the water and on shore. Dredging is planned to proceed 24 hours per day in order to complete the job as quickly as possible and minimize the disruption of the local animals. Marine mammals and sea birds that frequent the area would likely avoid the area due to the dredging. However, given the relatively short duration of the dredging activity and the typical mobility of the affected animals, potential impacts are expected to be short-term and the displaced animals should return after dredging is completed. To ensure that wildlife that could choose to use that area at night for resting will not be startled during the night, the following mitigation measure will be completed:

Mitigation Measure B3 – Night-time Activities (Lighting and Noise)

If nighttime activities are to occur at any time from dusk to dawn, the required lighting will be turned on before dusk and left on the entire night. Lights will not be turned on or off between dusk and dawn. Activities that could result in the startling of wildlife in the vicinity of the harbor will be allowed so long as they are initiated before dusk and not interrupted by long periods of quiet (in excess of 30 minutes). If such activities cease temporarily during the night, they will not be reinitiated until dawn.

Impacts from the maintenance dredging would be similar to but of a shorter duration and of a smaller magnitude than that of the initial dredging. As a result impacts to benthic organisms would be insignificant.

4.5.1.4 Essential Fish Habitat

The analysis of potential impacts to Essential Fish Habitat prepared in support of the SEIS identified ground fish species for which a Fisheries Management Plan had been prepared. As noted in Section 3.5.3 at least 18 managed species may be within the harbor. Of the 18 species

identified in the harbor surveys (Chambers Consultants and Planners, 1980, Chambers Group, 2000), two are managed under the Coastal Pelagic Species Fisheries Management Plan and 16 are managed under the West Coast Ground Fishery Management Plan. An Essential Fish Habitat Assessment has been prepared for this EA and is included in **Appendix H**.

Of the two species managed under the Coastal Pelagic Species Fisheries Management Plan, neither the northern anchovy or the jack mackerel would be affected by the project since they are transient visitors to the project area.

Of the 16 managed groundfish species that have been documented within the harbor, the loss of kelp within the dredge footprint would diminish the habitat value for all but the leopard shark and the spiny dogfish. However, for the other 14 potentially affected species, the reef habitat within the areas on either side and offshore of the dredge footprint have greater value than the low density kelp habitat growing on sand or cobble bottom within the dredge footprint. The kelp restoration that will be implemented following the initial dredging will be sized to accommodate impacts from subsequent dredging. Based on this action there will be no significant impacts to essential fish habitat from the initial dredging and the subsequent maintenance dredging.

4.5.1.5 Summary of Dredging Impacts

Potential impacts could result from the loss of kelp and benthic substrate, an increase in turbidity, and the noise and other activities in the harbor. However, with implementation of **Mitigation Measures W1, W2, and B1 through B3**, impacts from the initial dredging and subsequent maintenance dredging would be insignificant.

4.5.2 Temporary Sediment Storage

Use of the temporary sediment storage area would result in an extended duration of construction-related activities near the harbor area. In addition, it would result in a temporary reduction in the open space available for wildlife to use in this area.

4.5.2.1 Vegetation

The vegetation surveys of the temporary sediment storage area conducted for this EA identified no special-status plants in this area. Suitable habitat was not available for the San Luis Obispo monardella, and the Gaviota tarplant was not found although its flowering period and other characteristics would have allowed it to be observed at the time of the surveys. The black-flowered figwort is of sufficient size, 3 ½ to 4 feet tall, and has habitat associations different from those found at the site that make it unlikely that the plant occurs at the site yet went undetected. However because the surveys were not conducted at the optimal time of the year for the black-flowered figwort, the following mitigation measures will be implemented.

Mitigation Measure B4 – Preconstruction Plant Survey

A qualified botanist will conduct a preconstruction survey of the temporary sediment storage area and the EPT turnaround area at the optimal time of the year (April to June) for the presence of the black-flowered figwort. At the same time, the site will be resurveyed for the presence of the Gaviota tarplant and the San Luis Obispo monardella.

If any of these three plants are found within the temporary sediment storage area, the following mitigation measure will be implemented:

Mitigation Measure B5 – Special-Status Plants

The area containing the plant will be staked and flagged 50 feet around the plant to prevent machinery from entering the area. If the special-status plant on site is the San Luis monardella or the black-flowered figwort, seeds from these species will be collected and planted in an appropriate area adjacent to the project area. If the Gaviota tarplant is found within 50 feet of the project area, activities in this area will be stopped and consultation with the USFWS will be initiated as require by law under the Federal Endangered Species Act.

The area north of the site supports vegetation that was somewhat less disturbed than the project site, and in which, the more common plant *Deinandra paniculata* was observed. To preclude this less disturbed area from use for sediment storage, the following mitigation measure will be implemented.

Mitigation Measure B6 – Native Habitat Protection

Boeing will erect flagging to prevent access to the area beyond the northern boundaries of the site.

To mitigate potential vegetation impacts, Boeing will implement the following mitigation measure:

Mitigation Measure B7 - Revegetation

*The site will be revegetated using seeds taken from plants growing in the immediate vicinity. The site will be monitored for a period of three years to verify that successful revegetation has occurred. Other aspects of a site-specific revegetation plan will be implemented as necessary. A draft revegetation plan is provided in **Appendix C**.*

Because the area is dominated by non-native species and due to many years of cattle grazing, species found in the area currently will be used in revegetation. Creating an isolated patch of

native species likely would be unsuccessful, particularly because cattle grazing is expected to resume in the future once cattle would be allowed access to the area again. Using locally collected non-natives would achieve much quicker vegetation establishment and reduce erosion potential.

4.5.2.2 Wildlife

The burrowing owl may be a visitor to the area. Wintering owls occur in the area on occasion, but it has been two decades since breeding owls have been recorded in the area. It is unlikely that individuals would nest near the site or that the operation of the site would significantly affect these birds (Read 2000).

While their occurrence is not expected, if a burrowing owl were to establish a burrow at or close to the temporary sediment storage area, it could be affected by the use of the area. To avoid impacts to burrowing owls should they occur at the site, the following mitigation measures will be implemented:

Mitigation Measure B8 – Burrowing Owl Preconstruction Survey

To determine if burrowing owls are at the site, a preconstruction survey for individuals of this species will be conducted by a qualified biologist for individual burrowing owls. If no burrowing owls are found, the area would be disturbed to preclude the use of the area by these animals. This action is to avoid having owls trapped in burrows during project construction, if the birds move into the area following the survey.

Mitigation Measure B9 – Burrowing Owl Avoidance

If non-breeding burrowing owls occur at the site, a qualified biologist will observe these non-breeding birds until they leave their burrows. Once the owls are absent from their burrows, the biologist will excavate the burrows, making them unusable to the owls.

If breeding owls occur at the site, Boeing will avoid use of the site until the young birds have dispersed from the site, if project scheduling permits. At that time, a qualified biologist will excavate the burrows making them unusable. The need for mitigation for loss of burrows, in the form of burrow enhancement or other measures, would be determined based on a habitat survey by a qualified biologist. If project scheduling does not permit this delay, "passive relocation" techniques will be employed while the nesting pair and/or their fledged young are still present on site. A suitable burrow or burrows would be identified (and enhanced if needed), nearby but outside the project area, that will be available and utilized by the birds when their nesting burrow is destroyed. While the birds are away from their nesting burrow, the nest entrance would be covered to prevent re-entry, but the

burrow would not be destroyed until use of the alternative burrow(s) has been confirmed by a qualified biologist.

Because of the distance of the harbor from the nesting site of the peregrine falcons and the lack of features that would attract the peregrines to the harbor activities, there will be no impacts to these birds from this activity and no mitigation measures are required.

No new lighting would be provided to the temporary sediment storage area, so there would be no impacts to biological resources from this source.

4.5.2.3 Erosion

Runoff from the area would be limited since the sediments would be expected to absorb rainwater as readily as or more readily than the adjacent soils. In the event of a hard rain, the surrounding silt fence would control the erosion of the sediments. Since the sediments are marine sediments, it is possible that rainwater could leach out the salts and carry them downslope. If this were to occur, the affected vegetation could be impacted. However, this impact would be short-term, lasting until the sediments were removed and rain diluted the salts to a low level.

As discussed in Section 4.3, the use of calcium lignosulfonate to control dust would not be expected to affect wildlife or vegetation. It is a nontoxic binding agent that is approved for use in animal feed. This compound is water soluble and would dissolve in the rain. It would contribute to a localized increase in salt content of the soils. However, as discussed above, this effect would be of short duration, lasting until several rain events had washed it out of the soils. Since it is nontoxic, it would not affect the marine life were it to be transported to the ocean. Thus, no separate mitigation measures will be required for the use of this binding agent.

4.5.2.4 Summary of Impacts from the Use of the Temporary Sediment Storage Area

Impacts could occur from disturbance of special-status plant or animal species or from uncontrolled runoff. However, with the implementation of **Mitigation Measures B4 through B9** and the provisions of the SWPPP discussed in Section 4.3.2, impacts at the temporary sediment storage area would be reduced to an insignificant level.

4.5.3 Dock Modifications

Modifications to the dock would involve the use of heavy machinery to cut and remove the existing concrete and asphalt surface. As discussed in Section 4.5.1, the activity and noise might frighten some animals away from the dock. However, dock modification activities would be short-term (three to five weeks) and would not be expected to significantly affect local animals. The

modifications would occur entirely on the dock and would not affect plant resources. Dock modifications will be conducted during the day, so there would be no disturbance to nocturnal wildlife in the area from this activity.

Based on the lack of impacts, no mitigation measures beyond those discussed in Section 4.3.3 would be required.

4.5.4 Mooring Dolphin Refurbishment

Mooring dolphin refurbishment would occur from a barge moored next to each dolphin and should not last longer than fifteen days total. Refurbishment will occur consecutively for each dolphin. As discussed in Section 4.5.1, the activity and noise of the equipment might cause some birds or marine mammals to avoid or leave the area. However, once the activity is completed, the animals would be expected to return to their normal activities.

Mooring dolphin refurbishment would be conducted during the day, so there would be no disturbance to nocturnal wildlife in the area from this activity.

Based on the lack of impacts, no mitigation measures would be required.

4.5.5 EPT Turnaround Area

The construction of the EPT turnaround area is not expected to impact marine animals because it would occur well away from the shore. As discussed in Section 4.3, runoff would be controlled so that no sediment would reach the ocean.

The EPT turnaround area supports some grazing cattle but no special-status species are known to occur routinely in this area. No special-status plants would be affected by construction, although slightly over ½ -acre of vegetation will be lost. As discussed in Section 4.5.2, although special-status plants are not expected to occur in the area, **Mitigation Measure B4** will be implemented to verify that assumption. If any of these special-status plant species are found within 250 of the EPT turnaround area, Boeing will implement **Mitigation Measure B5**.

Based on the results of the original surveys these plants are not expected to occur on the EPT turnaround. With the implementation of **Mitigation Measures B4** and **B5**, impacts to special-status plants would be insignificant.

As discussed in Section 4.5.2, burrowing owls may visit the area on occasion, but would not be expected to nest in the project area. The **Mitigation Measures B8** and **B9** discussed in Section 4.5.2 would be implemented prior to construction.

Construction of the EPT turnaround area would occur during the day. There should be no impacts to nocturnal wildlife from this activity.

Impacts from the operation of the EPT turnaround could occur due to the increased level of activity at the site, although this activity would be limited to a two-day period up to six times per year. No special-status species are common to the EPT turnaround area and none would be expected to be impacted. In particular, while burrowing owls may frequent the area during winter months, they are not expected to nest near the site.

Because the EPT turnaround area would be lighted for one or two nights during the six times per year when the ship is being unloaded, the behavior of the local wildlife might be affected. The lighting would be provided by seven pairs of 400-Watt HPS lamps. Ship unloading and movement of the CBCs should be accomplished within a 24- to 48-hour period, so the lights at the EPT turnaround area should only be on for one or two nights during each of the six annual visits. The lights would be observable for a long distance, since there are few trees to block the view and the surrounding foothills would allow wildlife to see the area. While the lighting would be sufficient for operations at night and observable from a long distance, it is not expected to be bright enough to pose a significant impact to wildlife. To avoid impacts to nocturnal wildlife from the lights suddenly being turned on in the middle of the night **Mitigation Measure B3** will be implemented.

With the implementation of **Mitigation Measures B3, B4, B5, B8, and B9**, impacts to biological resources from the construction and operation of the EPT turnaround would be insignificant.

4.5.6 Vessel Operations

The arrival, presence, and departure of vessels would likely cause some birds and marine mammals to leave or not enter the harbor due to the presence of people, heavy machinery, and artificial lighting.

Lighting would be increased slightly from the present levels at the dock with the addition of three pairs of 1,000-Watt HPS lights aimed at the dock surface and some lighting associated with the ship itself. When a vessel is at the harbor, unloading would be conducted continuously to minimize the time that the ship is docked. The full complement of lights trained on the dock would be used for night-time activities. In discussions with Lee Ann Carranza (USFWS), she indicated that the USFWS was concerned with the lights of the harbor (and EPT turnaround area) being turned on during the middle of the night and disturbing wildlife that had settled in for the night. As a consequence, and as specified in **Mitigation Measure B3**, Boeing agreed that when the ship is at the dock at dusk, the lights will be activated well before darkness and left on until all lights can be turned off. Similarly, if the ship is scheduled to arrive during the early morning necessitating turning the lights on, the lights will be turned on at dusk the night before and left on all night. With

the implementation of these procedures, the increase in lighting would not significantly affect animals in the area (Naue, 2000).

Kelp is present on the water surface between the breakwater and docking dolphins, and some strands may extend into the area where the ship would be moored. Kelp that is within the dredge footprint would be removed during dredging, but it is expected to regenerate in the future. The loss of kelp within the dredge footprint will be mitigated for by the implementation of **Mitigation Measure B1**. To avoid impacts to kelp that may occur outside of the dredge footprint during vessel maneuvering, the following mitigation measures will be implemented:

Mitigation Measure B10 – Avoid Vessel Use in Kelp Beds

Vessels using the harbor will follow a predetermined route that limits crossing kelp beds to the extent feasible.

Mitigation Measure B11 – Anchoring in Kelp Beds or Hard-Bottom Habitat

No vessels will anchor within kelp beds or hard-bottom habitat outside of the dredge footprint, and no vessel anchors within the dredge footprint will be placed in kelp or hard-bottom habitat.

The ship would not generate substantial noise or hazards to nearby animals. Boeing evaluated noise impacts from the operation of the EPT and determined that noises reaching the nearby beach could be differentiated from the background surf noise under calm conditions (Acentech, 1998). The Acentech report also noted, however, that the activity at the ship would likely cause sensitive wildlife to temporarily abandon the area prior to noise generation associated with the EPT. Seals on the near end of the adjacent beach, roughly 300 feet of the dock, could perceive the noise associated with offloading the ship causing them to leave the harbor. However, once the ship leaves the harbor, harbor seals, sea otters, and pelicans would be expected to return to the harbor and resume their normal behavioral patterns quickly. **Mitigation Measure B2** will be implemented to ensure that impacts do not occur.

The Chambers Consultants and Planners report (1980) indicated that people trampling through the intertidal zone had historically impacted the local intertidal biota at the harbor area. This impact could be increased if large numbers of crew members or other people at the dock were to venture into the local intertidal zone, crushing the plants and animals there. However, the terms and conditions for operations of ships entering the harbor prohibit the crew from leaving the ship for recreational purposes in the harbor area. Other individuals allowed at the dock during loading and unloading would be focused on their job duties and would not be allowed to wander off on their own during that time. Finally, Boeing would have a site manager present who would be in charge of the loading/unloading operations at the site; this individual would prevent people from entering the intertidal zone. Because of these contractual and practical restrictions, the project

would not impact local intertidal biota. To ensure that these restrictions are followed, the following mitigation measure will be implemented.

Mitigation Measure B12 – Intertidal Access

The restrictions on access to the intertidal area will be included in the personnel orientations provided at project startup and for new employees.

Potential impacts to water resources from oil spills were addressed in Section 4.3.6. A major spill of petroleum into the harbor water could result in substantial impacts to the local biota depending upon the amount and type of product spilled, the biological resources that contact the oil, the amount of time the oil is in the environment, and the local oceanic conditions at the time of the spill. If birds or marine mammals contact the oil, they could become fouled and die. Oil that becomes stranded in the intertidal could kill the plants and animals living there. If a spill were to occur during very calm conditions with an ebbing tide, the oil could magnify the stress that intertidal organisms may experience when exposed. Alternatively, a spill of one or two gallons of diesel fuel that occurs during turbulent conditions and that does not contact biological resources would be dissipated without impact. Because there are numerous naturally occurring petroleum seeps that occur along this area of the coast, the microbial fauna in the local water is readily adapted to decompose these organic sources. A small spill of light constituents would likely be naturally remediated readily.

Based on the design of the Delta Mariner and the small size and maneuverability of the assist tugs coupled with the implementation of the vessel oil spill contingency plans, the potential for a major oil spill is small and therefore the impact to biological resources would be insignificant. It should be noted that the barge proposed for transporting the launch table does not carry fuel.

The potential impact of the introduction of non-indigenous species via ship ballast water would not be expected to be significant. The Delta Mariner and the barge carrying the launch table would comply with state and federal regulations governing ballast water management. The federal program is administered by the U.S. Coast Guard, and includes at-sea ballast water exchange procedures to minimize the potential that non-indigenous species would be introduced into coastal embayments and estuaries. The state program is implemented under AB 703, the "Ballast Water Management for Control of Non-Indigenous Species Act," effective January 1, 2000. The program is administered by the CSLC through Public Resources Code Sections 71206-71207 and is consistent with the federal program. No specific mitigation measures will be required to document compliance with this requirement since this program is regulated outside the jurisdiction of the VAFB, CSLC, and CCC environmental staffs.

Operations of a vessel in the harbor would not affect Essential Fish Habitat, since the habitat of the fish species managed by the Pacific Fisheries Council would not be significantly affected by the vessel entering or leaving the harbor. Although the presence of the vessel could lead to short-term impacts such as individual fish temporarily leaving the area, no long-term impacts to the habitat on ecology would be anticipated. In the absence of long-term effects, no mitigation measures would be required.

4.5.7 Summary of Impacts to Biological Resources

Impacts to harbor biological resources from the various actions described in this section would result primarily from the presence of construction equipment (including tugs, barges, cranes, and other heavy machinery) and operational equipment (including the Delta Mariner and the EPT). While this equipment would generate increased noise levels perceptible by the local wildlife, it is likely that the increase in human activity would be as important as the noise in affecting the wildlife. However, the activities would be short-term and aperiodic. Construction activities in the harbor would likely require up to 3 months to complete the dredging, refurbish the docking dolphins, and modify the dock, although activities at the temporary sediment storage area would last up to 6 months. Operationally, ship calls would be up to six times a year, but for only a maximum of 48 hours at a time.

Although the harbor area is used for resting and foraging by a wide diversity of wildlife species including special-status species such as southern sea otters and California brown pelican, no marine wildlife species and very few terrestrial wildlife species (none of which are special-status species) breed in the area. Also, no special-status plant species or habitats are expected to be impacted. Based on the absence of significant impacts to the local wildlife, the proposed actions would not be expected to significantly impact biological resources.

The maintenance dredging will not result in significant impacts to fish species for which a Fisheries Management Plan has been prepared for at least three reasons. First, the dredging will be limited to the original dredge footprint. Second, impacts to kelp in this areas will have been compensated for by the establishment of the compensatory kelp habitat through implementation of **Mitigation Measure B1**. Finally, there is a considerable amount of available habitat for both benthic and kelp-associated affected fish, so they could move away without harm.

4.5.8 Alternatives

The following subsection discusses the biological resources impacts from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements.

4.5.8.1 No Action Alternative

Implementing the No Action alternative would result in no impacts to biological resources, because the harbor would not be used for the EELV program.

4.5.8.2 Alternative Dredging Method

Implementing an alternative dredging method would result in impacts to biological resources both from direct removal of sediment-dwelling animals, and indirectly from animals avoiding the area during dredging.

Dredging would remove the active crustaceans characteristic of the sediments in front of the dock. However, because these crustaceans are so mobile, it is likely that they would rapidly recolonize this area after dredging is completed.

Sensitive mobile animals would likely avoid or leave the area in response to the increased noise and activity level. However, they would be expected to return after the dredging and other harbor activities are concluded. Based on these factors, suction dredging would not cause a significant impact to the local biological resources.

4.5.8.3 Limited Operational Time

Limiting the operational time of the vessel in the harbor to daylight hours would reduce the night-time impacts to biological resources, because there would be much less activity during the night. However, nocturnal impacts would not be eliminated because the ship would still be in the harbor, and at least a minimal level of activity associated with standard vessel operation would continue on board the vessel even if operational activities were limited. By limiting the operational time, the duration that the vessel would remain in the harbor would increase, which would lengthen the short-term impacts to biotic resources that are sensitive to the presence of the vessel in the harbor. The implementation of this option would not result in a significant impact to biological resources.

4.6 Cultural Resources

Effects to cultural resources would be considered adverse if the undertaking directly or indirectly alters any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. For known cultural resource sites, rerouting to avoid impacts is typically the recommended option. If rerouting is not possible, subsurface testing is usually recommended to determine a site's value or data potential relative to the NRHP to assess possible project effects, and to establish the physical relation of site boundaries with the APE. In

addition, Civil Engineering Environmental Planning Cultural Resources (CEVPC) requires archaeological and Native American monitoring during construction through or adjacent to any known site, regardless of the site's NRHP eligibility.

The APEs for the proposed action have been completely surveyed for both prehistoric and historic resources. Three sites are adjacent to the APEs for the harbor area, EPT turnaround area, and temporary sediment storage area. The proposed project is also located within the viewsheds of two additional historic resources. Each of these sites is described in Section 3.7.2. No known Traditional Cultural Properties are located within the project area. Thus, the project would not affect any of these resources. Potential impacts from the proposed project and mitigation recommendations for each resource are presented in **Table 4-2**. Individual project elements also are addressed in **Table 4-2**.

The harbor area is adjacent to site CA-SBA-3547H (the Point Arguello Coast Guard Lifeboat Rescue Station) and within the viewshed of the Anza Trail and the Sudden Ranch Historic District.

Because the Anza Trail is a landscape resource rather than having physical components, any impacts to this resource would be visual in nature. The Sudden Ranch Historic District is at a sufficient distance from the harbor that visual impacts also would be the only concern regarding this resource. However, the modifications to the harbor area would not involve adding new features, but rather modification of existing ones. Finally, the vessel and vehicle transport operations would be intermittent and temporary, and not a permanent addition to the visual landscape. For these reasons, activities in the harbor area would not be expected to cause any impacts to the Anza Trail or the Sudden Ranch Historic District.

4.6.1 Harbor Dredging

An underwater study of the Point Arguello Boathouse harbor was conducted prior to its first dredging (NPS 1978). No underwater sites were identified in the study, and no additional studies were recommended. The harbor has been subsequently excavated to below bedrock and redredged on a second occasion. Based on this information, the dredging would not impact any cultural resources. In addition, the equipment would be located on the dock or on a barge during dredging operations, so no impact on the Rescue Station property (CA-SBA-3547H) would be anticipated. Based on this analysis, no mitigation measures are required.

4.6.2 Temporary Sediment Storage

The proposed temporary sediment storage area would be approximately 10,000 square yards in area, with approximately 15,000 cubic yards of sediment piled about 3 yards high. A 20,000 square yard proposed temporary storage area was initially identified during planning for sediment storage.

Table 4-2
Summary of Cultural Resource Impacts and Recommendations

Resource	NRHP Status	Impacts	Recommendations
CA-SBA-636	Not evaluated	Avoided	Archaeological and Native American Monitoring
CA-SBA-1542	Determined Eligible	<p>Construction of EPT Turnaround does not affect qualities of the site that make it eligible. SHPO agrees.</p> <p>Temporary sediment storage is planned for an approximately 10,000-yd² area approximately 85 meters from the outermost tested margin of CA-SBA-1542. Materials at the extreme margins of this lithic quarry site are extremely sparse and do not hold the same qualities or data potentials that make the site significant. In addition, vegetation and geofabric will be placed between the site and stored sediment; removal of sediment and geofabric will be monitored, therefore no significant impacts would be expected from the storage or removal of sediments.</p>	Mow the ground surface and leave vegetation in place; place geofabric on top of moved vegetation. Place sediment on geofabric. Monitor removal of sediment and geofabric by archaeologist and Native American observer to ensure that site surface is minimally disturbed.
CA-SBA-3547H	Determined Eligible by the Keeper of the Register	Dock modifications and dolphin refurbishment would not affect CA-SBA-3547H because the dock is not an element of the site. In addition, neither these activities nor vessel operations would affect the look or feeling of the site.	None
Sudden Ranch Historic District	Initially recommended by historic consultant as Eligible as Historic District. Information has not yet gone to SHPO.	Project elements would not materially affect the Historic Districts' viewshed. No impacts anticipated.	None
Anza Trail	National Park Service National Historic Trail. Assumed Eligible	The installation of the EPT turnaround would impact the Anza Trail's historic viewshed, although not the Anza Trail itself. Impacts would be greatest from the seven light poles.	Ensure the light poles are painted or otherwise manufactured to be a neutral color.

The westernmost 1999 test unit at CA-SBA-1542 was excavated approximately 85 meters southeast of the southeast edge of this 20,000 yd² area. The results of this test excavation were very sparse but positive, effectively enlarging the boundary of the site (Harro and Gerber, 1999b). As described above in Section 3.7.2.3, CA-SBA-1542 is a lithic quarry and because of this sparse chipping debris may be expected to occur in an area quite widespread from this site; however, the site's actual boundaries have not been tested. For this reason it is possible, although unlikely, that placement of sediment in the temporary storage area would impact the sparse chipping debris associated with CA-SBA-1542. Impacts would be to an extremely peripheral area of the site that does not hold the same qualities or data potentials that make the site significant.

It is recommended that prior to placement of the sediment, the site's surface be mowed and the vegetation left in place. No grading or ground disturbance would occur. Geofabric would be placed on top of the cut vegetation. Sediment would be placed on top of the geofabric. Sediment removal would be conducted with small equipment, by hand, if necessary to avoid damaging the geofabric and site surface. Sediment and geofabric removal would be monitored by an archaeologist and Native American Observer. With the implementation of these steps, no significant impacts are expected from the storage or removal of sediment.

4.6.3 Dock Modifications

The existing dock was constructed in support of the Space Shuttle program, subsequent to the designation of the Boathouse (the former Point Arguello Coast Guard Lifeboat Rescue Station) as an NRHP-eligible property. The dock is an intrusive engineering feature that does not constitute a contributing element of CA-SBA-3547H (Carucci, 2000). The dock was not in any way connected to the original Coast Guard Station and was not used for its originally intended purpose (the Space Shuttle program). For these reasons, its modification and use for the EELV program would not constitute a potential impact to the site. Based on this analysis, no mitigation measures are required.

4.6.4 Mooring Dolphin Refurbishment

No impact to cultural resources would be expected as a result of the mooring dolphin refurbishment activities. As a result, no mitigation measures are required.

4.6.5 EPT Turnaround Area

The proposed EPT turnaround area would be located between the mapped surface boundaries of CA-SBA-1542 and CA-SBA-636. In July 1998, subsurface testing was conducted to determine if cultural resources were present within the EPT turnaround area APE and, if so, to evaluate the effect of the proposed project on the resources. Cultural materials associated with CA-SBA-1542 were found within the APE. However, the materials within the APE do not possess the same

qualities or data potentials that make the site significant. Additional testing was conducted in September 1998 following Boeing's modifications of the EPT pad. Based on this testing, it was concluded that the revised pad area avoids CA-SBA-636 completely and is located within an outer portion of CA-SBA-1542 that does not contribute to its NRHP eligibility. This opinion was forwarded to the California SHPO in a letter dated March 31, 1999 (Alexiou, 1999). On June 27, 1999, 30 CES/CEV VAFB received a letter from the acting SHPO agreeing that the characteristics that make CA-SBA-1542 eligible for inclusion in the NRHP would not be affected, and that implementation of the activities described in the March 31, 1999 letter would not adversely affect historic properties. Based on this analysis, no mitigation measures are required.

The light fixtures surrounding the turnaround area as well as the paved area itself would impact the Anza Trail historic viewshed, although the Anza Trail itself would not be impacted. The following measure will be used to minimize visual impacts to the viewshed:

Mitigation Measure C1 - EPT Turnaround Area Lighting

The light fixtures surrounding the EPT turnaround area will be a neutral color to blend in as much as possible with the surrounding natural environment. The use of neutral colors for the light poles would mitigate impacts to the Anza Trail historic viewshed caused by the presence of the new light poles.

4.6.6 Vessel Operations

No impact to cultural resources would be expected as a result of vessel operations in the harbor. As a result, no mitigation measures are required.

4.6.7 Alternatives

The following subsections discuss the cultural resources impacts from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements.

4.6.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment, and therefore would result in no impacts to cultural resources.

4.6.7.2 Alternative Dredging Method

Implementing an alternative dredging method would not result in impacts to cultural resources, since no cultural resources have been identified in the harbor.

4.6.7.3 Limited Operational Time

Limiting the duration of vessel activities would result in no impacts to cultural resources, since the operation of the ship in the harbor would not impact cultural resources.

4.7 Transportation

An impact to transportation resources would be considered significant if the proposed harbor activities affect key roadways and railroads in the vicinity of the harbor.

4.7.1 Proposed Actions

The effects on key roads expected to be impacted by construction worker vehicles, including operations associated with the proposed harbor activities, are addressed in Section 4.4.1.2.2 of the FEIS. Direct and indirect traffic impacts were determined for local roadways, including Coast Road and Bear Creek Road on South VAFB. Peak-hour traffic generated by construction worker vehicles is addressed in the FEIS. The conclusion of the traffic analysis in the FEIS is that the construction of the facilities would result in a temporary increase in local traffic at several intersections. However, this increase would be very brief and would not affect the levels of service on any of the roadways. Impacts to transportation from implementation of the EELV program were judged to be insignificant.

Now that Boeing is in the construction phase of the EELV program, it is evident that conservative numbers of trips were included for workers cars and construction vehicles in the analysis of traffic volumes. The few additional cars that would be associated with the dredging and construction activities at the harbor would fall within the general estimate of traffic loads evaluated in the FEIS. As a result, no significant impacts to traffic would be expected from these harbor-related actions, and no mitigation measures are required.

4.7.2 Alternatives

The following subsections evaluate the No Action alternative for the six project elements as well as the two alternatives.

4.7.2.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment, and therefore, no impacts to transportation would occur.

4.7.2.2 Alternative Dredging Method

The few additional cars (up to eight vehicles) that would be associated with dredging would be expected to fall within the general estimate of traffic loads evaluated in the FEIS. As discussed above, these impacts were over estimated in the EIS traffic analysis, yet still were determined to be insignificant. Thus, traffic impacts from the use of the alternative dredging method would be insignificant.

4.7.2.3 Limited Operational Time

The few additional cars (up to twelve vehicles) that would be associated with vessel operations would be expected to fall within the general estimate of traffic loads evaluated in the FEIS. As discussed above, these impacts were over estimated in the EIS traffic analysis, yet still were determined to be insignificant. Thus, traffic impacts from limiting the operational time of the vessel would be insignificant.

4.8 Hazardous Materials and Hazardous Wastes

Impacts to hazardous materials and waste management would be considered significant if they resulted in noncompliance with applicable regulatory guidelines or increased the amounts generated beyond waste management capacities.

No hazardous materials would be used at the harbor for this project, aside from the fuels and lubricants in the vehicles and vessel. Environmental impacts would be limited to fuels spilled during refueling of the dredge, refurbishment, and other construction activities. Fueling of equipment other than the dredge will be completed at least 100 feet from the water. Fueling would be limited to an area designed to capture run-off or spilled fuel using secondary containment. Boeing would maintain spill response kits at the harbor area and the EPT turnaround to mitigate minor spills (less than 50 gallons). Spill response kits would contain, at a minimum, absorbent grit ("kitty litter"), absorbent pads, large plastic storage bags, gloves, a receptacle for storage of soiled materials, and a rake or shovel to pick up soiled grit and pads. Spills over 50 gallons would require response from the 30th Wing Fire Department. Large spills into the harbor would require response from the U.S. Coast Guard. Boeing marine contractors, such as Foss Maritime, are obligated to have their own spill response kits and procedures prior to commencing operations on Boeing licensed property. Large spills resulting from contractor actions would necessitate response from the 30th Wing or the U.S. Coast Guard. Boeing or its contractors would bear the cost of this response. The 30th Wing Environmental Compliance Group would receive written notification of spills of any size at this location. Hazardous materials resulting from spill clean up activities would be transported off site and disposed of in an approved disposal facility under either Boeing's or the response contractor's federal EPA ID number.

4.8.1 Harbor Dredging

No hazardous materials would be brought to the harbor area during dredging activities, with the exception of diesel fuel to resupply the crane and, if necessary, other trucks or earthmoving equipment. Equipment would be moved at least 100 feet from the water for refueling, except the barge-mounted crane. Standard safety procedures would be used to minimize the potential for fuel spills. In addition, spill cleanup materials would be maintained onsite to deal with a spill of fuel into the water or on land. Examples of such procedures and materials are discussed in Section 4.3.

Based on the absence of potential environmental impacts, no mitigation measures are required.

4.8.2 Temporary Sediment Storage

As discussed in Section 4.3, tests performed on the harbor sediments indicate that the material is not hazardous and that the sediment can be used as fill (ENSR, 2000). Because there would be no hazardous materials associated with this activity, there would be no potential for impacts and no mitigation measures are required.

4.8.3 Dock Modifications

No hazardous materials would be brought to the harbor area during dock modification activities, with the exception of diesel fuel to resupply heavy equipment needed to complete the modifications. Best Management Practices would be used to minimize the potential for fuel spills, including using drip pans under equipment while not in use, using secondary containment when transferring fluids, and inspecting vehicles for leaks. Leaking vehicles would not be allowed on the project site. In addition, absorbent materials and a containment boom will be maintained onsite to deal with a spill of fuel into the water or on land. Wastes generated from the modification activities would consist primarily of construction debris (concrete, soil, wood, rebar, etc.). These materials would be disposed of off- base in an approved landfill or recycler.

Based on the absence of potential environmental impacts, no mitigation measures are required.

4.8.4 Mooring Dolphin Refurbishment

No hazardous materials would be needed during dolphin refurbishing activities. Wastes generated from the modification activities would consist primarily of construction debris.

Based on the absence of environmental impacts, no mitigation measures are required.

4.8.5 EPT Turnaround Area

No hazardous materials would be brought to the harbor area during construction of the EPT turnaround, with the exception of diesel fuel to resupply heavy equipment needed to complete the construction. Best Management Practices would be used to minimize the potential for fuel spills, including using drip plans under equipment while not in use, using secondary containment when transferring fluids, and inspecting vehicles for leaks. Leaking vehicles will not be allowed on the project site. In addition, absorbent materials would be maintained onsite to deal with a fuel spill. Wastes generated from the construction activities would consist primarily of construction debris (concrete, soil, wood, rebar, etc.).

Based on the absence of potential environmental impacts, no mitigation measures are required.

4.8.6 Vessel Operations

No hazardous materials would be brought into the harbor as a result of activities associated with vessel operations. The Delta Mariner would transport CBCs to VAFB, but the CBCs' storage tanks would be empty during transport. Ordnance may be attached to the CBCs, but the ordnance would not be armed. No refueling of the ship would occur at VAFB, although there could be the loss of some lubricants from the EPT or equipment on the vessel. Because the spill potential is expected to be small, and because a spill response plan would be in place and implemented as part of the unloading operations, impacts from such a spill would be insignificant.

Based on the absence of environmental impacts, no mitigation measures are required.

4.8.7 Alternatives

The following subsections discuss the hazardous materials and hazardous wastes impacts from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements.

4.8.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment, and therefore would result in no impacts from hazardous materials and hazardous waste.

4.8.7.2 Alternative Dredging Method

Implementing an alternative dredging method would require the use of fuels for the dredge and other heavy equipment. Since there would be an appropriate spill response capability at the dock

during construction activities, the alternate dredging method would not result in a significant impact from hazardous materials.

4.8.7.3 Limited Operational Time

If the vessel were to be unloaded only during daylight hours, there would still be the potential for spills of lubricants from either the EPT or equipment on the vessel. If such a spill were to occur during daylight hours, cleanup would likely be easier than if it were to occur at night. Impacts from a spill would be expected to be insignificant, given the low probability of such an occurrence taking place. In the event that an occurrence should arise, the spill response plans would already be in place prior to the first vessel call.

4.9 Geology and Soils

An impact to geological resources would be considered significant if the proposed harbor activities significantly changed the physiography of the area, impacted any unique geologic features, or affected geologic features of unusual scientific value. Moreover, an impact would be considered significant if it resulted in substantial erosion. Impacts to geological resources, including soils, could occur during dredging or EPT construction activities.

Construction of the EPT turnaround would nominally alter the topography of the site. However, it would not change the physiography of the region, nor would it impact any unique geological features or geologic features of unusual scientific value. Geologic concerns for the harbor area would be the potential effects of erosion and landslides, primarily related to fill activities during construction of the EPT turnaround, and earthquakes that could occur during harbor activities.

4.9.1 Harbor Dredging

Dredging activities would entail removing sediment to return the harbor to its previously dredged depth of approximately 10 feet below MLLW, plus an approximate 2-foot overdredge. Based on several investigations into the depth of the harbor (ENSR, 2000), the hard-bottom substrate is not of a uniform depth. There are pockets in the area in front of the dock where the hard bottom is over 18 feet below MLLW. It was in this area that the sediments were found to have slightly elevated metals concentrations. The harbor channel and vessel maneuvering area would be dredged to the level of its prior dredging depth, thus avoiding impacts to undisturbed sediments below roughly 12 feet below MLLW.

Dredging would be performed in accordance with USACE and CSLC permit requirements. Approximately 15,000 cubic yards of sediment would be dredged; dredged material would be used as fill for the proposed EPT turnaround and for various EELV construction projects. There are no unique geologic features or geologic features of unique scientific value in the harbor. As a

result, there would be no significant impacts to the geology of the site, and no mitigation measures are required.

4.9.2 Temporary Sediment Storage

Dredged sediments would be stored at the temporary storage area for up to 6 months before being removed and the site reclaimed. The site would have a silt fence surrounding it to minimize erosion from the pile. Based on the temporary nature of the activity and the protective measures to be put into place with the proposed action, there would be no impacts to geological resources from this activity.

4.9.3 Dock Modifications

Construction activities at the dock would not affect natural geologic resources. Therefore, no impacts would be anticipated, and no mitigation measures required.

4.9.4 Mooring Dolphin Refurbishment

Dolphin refurbishment activities would not affect natural geologic resources in and around the harbor area. Therefore, no impacts would be anticipated, and no mitigation measures required.

4.9.5 EPT Turnaround Area

Construction of the EPT turnaround would require typical grading and filling activities along with constructing a paved parking/turnaround area measuring approximately 60 feet by 450 feet. While an area of this size would not trigger the requirement for a separate SWPPP, Boeing is preparing such a plan to include activities at the harbor. The implementation of this plan would minimize erosion impacts. Therefore, no mitigation measures are required.

4.9.6 Vessel Operations

Vessel operations would not affect natural geologic resources in the vicinity of the harbor. Therefore, no impacts are anticipated, and no mitigation measures required.

4.9.7 Alternatives

The following subsections discuss the impacts to geologic resources from the No Action alternative, alternative dredging method, and limited ship operation time alternative for the six project elements.

4.9.7.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment, and therefore would result in no impacts to geological resources.

4.9.7.2 Alternative Dredging Method

Implementing an alternative dredging method would result in the removal of sediments that have accumulated since the last time the harbor was redredged in 1989. Because no unique geologic features or features of scientific value would be impacted by the use of suction dredging, impacts to geological resources would be insignificant.

4.9.7.3 Limited Operational Time

No impacts to geological resources would be anticipated from the offloading of the vessel, irrespective of the offloading schedule.

4.10 Utilities and Energy

An impact to utilities would be considered significant if it resulted in substantial increases in utility consumption.

4.10.1 Proposed Actions

The six harbor-related elements of the Proposed Action are expected to create minimal increases for some utilities during the short duration in which these operations occur. There would be no requirement for the construction of new utility service facilities such as power or sewer lines. However, existing 12.47 Kv power lines at the EPT turnaround site would be relocated underground. Up to seven new light poles and an electrical transformer would be installed along the north side of the EPT turnaround area (**Figure 2-6**). Two 400-Watt HPS lamp fixtures would be mounted to each light pole. The light fixtures would only be used during the occasions when cargo is offloaded from the ship. Since the ship would visit the harbor approximately six times per year, for up to 48 hours per visit, the light fixtures would be on for less than 200 hours per year. Similarly, dredging for 10 days for 24 hours per day would result in roughly 100 hours of lighting use over the duration of the dredging. Given the extensive energy use at the base relative to this minor power use, the electrical power demand of the proposed action would have an insignificant impact on the overall power consumption at VAFB. The dock modifications, dolphin refurbishments, and EPT turnaround construction would not require the use of utilities. Based on these minimal impacts, no mitigation measures are required.

4.10.2 Alternatives

The following subsections evaluate the impacts to utilities and energy resulting from the No Action alternative for all six project elements, as well as the two alternatives (suction dredging and limited ship offloading) identified in Section 3.0.

4.10.2.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment. Therefore, no impacts to utilities would occur.

4.10.2.2 Alternative Dredging Method

The use of a suction dredge would result in no impacts to utilities, because this method of dredging would not use utilities.

4.10.2.3 Limited Operational Time

Limiting the offloading of the vessel to daylight hours would not reduce the need for additional light fixtures at the dock. By eliminating the night-time offloading to daylight hours, the duration that the vessel would be in the harbor would likely be extended. With the ship at the dock longer, there could be a slightly higher electricity usage, since the night-time lighting system on the dock would be in use as long as the vessel is in the harbor.

4.11 Health and Safety

An impact would be considered significant if it would create a potential public health hazard, or involve the use, production, or disposal of materials that pose a hazard to people, animals, or plant populations in the affected area.

4.11.1 Proposed Actions

In general, construction contractors must comply with Cal-OSHA requirements and other recognized standards for operations that involve construction. Contractors must also provide for the health and safety of their workers and all subcontractors who may be exposed to health and safety risks. Each contractor will be required to submit a health and safety plan to Boeing for review and approval and to appoint a formally trained individual to act as safety officer. The contractor health and safety plans will present overall health and safety requirements, e.g., appropriate personal protective equipment (such as hard hats, safety glasses, hard-toed shoes, etc.) as well as requirements applicable to the task-specific potential hazards associated with each contractor's scope of work. As applicable, the various plans will cover issues such as

vehicle and heavy equipment use, excavation safety, confined space entry, small tools and power equipment use (electrical and fuel-powered), fueling and fuel storage, working at elevation (e.g., ladders and scaffolding, warning signals), procedures for reporting injuries on the job site, obtaining medical treatment for injuries, notifications and responsibilities and response procedures for emergency situations, etc. The appointed safety officers will be the points of contact on all issues involving job site safety.

During performance of work, each contractor must comply with all provisions and procedures prescribed for the control and safety of contractor personnel and visitors to the job site. Access to the harbor area would be restricted to construction personnel, and the harbor area would be closed for recreational purposes during construction activities.

The following mitigation measure will ensure that adequate sanitary facilities are available at the site.

Mitigation Measure H1 – Sanitary Facilities

Boeing or its primary contractors will supply portable restroom facilities for crews working at the harbor during construction to avoid having to rely on the current facilities. For operational needs, Boeing will ensure that restroom facilities are adequate. If the existing facilities are used, Boeing will have them serviced prior to and following each ship call by the Delta Mariner.

For the activities proposed in this EA, Range Operations would be notified at least 48 hours prior to the onset of harbor activities. The approximate start and end dates of each activity would be given. This includes dock modification activities, EPT construction activities, as well as periods when any vessel is in the harbor waters. If any of the proposed activities occur within the window of a launch from VAFB, activities at the harbor (including activities at the proposed EPT turnaround) would be suspended, and these areas evacuated according to the standard operating procedures established by Range Operations.

With the implementation of these procedures, the harbor-related activities should pose no hazard to public or worker health and safety.

4.11.2 Alternatives

The following subsections evaluate the No Action alternative for all six project elements as well as the two other alternatives identified in Section 3.0, suction dredging and limited ship offloading.

4.11.2.1 No Action Alternative

Implementing the No Action alternative would not change the existing environment; therefore, no impacts to health and safety would occur.

4.11.2.2 Alternative Dredging Method

The use of the suction dredging method would still require compliance with Cal-OSHA requirements. Since these requirements must be implemented, there would be no significant impacts to health and safety.

4.11.2.3 Limited Operational Time

Limiting the vessel activities to daylight hours could reduce the potential for accidents, since lighting would be better than during the night-time hours. Since the offloading operations would comply with Cal-OSHA requirements, the impacts would be insignificant.

4.12 Environmental Justice

The project elements discussed in this EA would occur in relative isolation along the coast at the southern edge of VAFB, separated from the nearest residential center by Tranquillon Mountain. Because the project is so far removed from residential areas, no environmental impacts would accrue to any ethnic or socioeconomic group disproportionately over any other.

4.13 Growth Inducing Impacts

As discussed in the FEIS (Section 4.2.1.2.2), this general area has historically supported these sorts of launch related activities and the overall EELV program would not result in an increase in population in the Lompoc area. Thus, implementation of the elements discussed in this EA would not induce growth in the surrounding area either in the short-term or long-term.

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5.0 CUMULATIVE IMPACTS

Cumulative effects result from the incremental effects of the Proposed Actions when added to other past, present, and reasonably foreseeable future actions, regardless of what organization undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The only project that would potentially combine with the current project to yield cumulative impacts would be the overall EELV program, as described and evaluated in the FEIS and SEIS. However, proposed project impacts in the majority of issue areas would be very localized and would not yield cumulative effects. These issue areas include:

- Land Use
- Noise
- Hazardous Materials and Wastes
- Cultural Resources
- Geology and Soils
- Utilities
- Water Resources
- Health and Safety
- Environmental Justice

Only three issue areas, air quality, biology, and transportation, have potential impacts that could extend beyond the immediate harbor area. These issue areas are discussed below.

Air Quality - Impacts from the harbor activities would be limited to the formation of PM₁₀. PM₁₀ formation would be very localized and not of sufficient magnitude to provide a cumulative impact from PM₁₀ generating activities associated with the other EELV actions. Emissions from construction equipment exhaust are evaluated in the SEIS for the EELV, so there would be no new, cumulative impacts from that source. Thus, there would be no cumulative impacts to air quality from this action and the other EELV actions. Furthermore, since the maintenance dredging will take place during the operational phase of the program, when annual emissions are less than ½ those of the construction phase, there would be no cumulative impacts from the maintenance dredging.

Biology - Impacts from the harbor activities would be limited to the temporary relocation of marine birds and mammals from the harbor area during the dredging, vessel calls, and

redredging. These same wildlife species would also likely be affected by the noise from rocket launches. The frequency of the rocket launches would be greater than the frequency of EELV-related disturbances at the harbor. Given the sporadic nature of both types of events, the temporary nature of the disturbances, and the different types of disturbance from each action, it is unlikely that these two actions (harbor-related and launch-related) would result in cumulative impacts.

Similarly, cumulative impacts from successive episodes of maintenance redredging would not be expected to occur since disturbance to marine birds and mammals would be sufficiently infrequent and sporadic that these animals would not leave the area permanently. Also, through the establishment of the new kelp habitat, kelp lost in subsequent maintenance redredging efforts would have already been compensated for. Thus, there would be no cumulative impacts from the redredging.

Transportation - The proposed project would contribute a minimal amount of additional traffic associated with dredging and construction activities. However, the few additional cars fall within the general estimate of traffic loads evaluated in the FEIS. Based on these considerations, there should be no cumulative impacts from this project, when considered in conjunction with the full EELV program.

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APPENDIX A

MSDS FOR

CALCIUM LIGNOSULFONATE

APPENDIX B

SEDIMENT PHYSICAL AND CHEMICAL ANALYSIS

APPENDIX C

DRAFT ENVIRONMENTAL PLANS

C-1 – Revegetation Plan

C-2 – Water Quality Protection

C-3 – Storm Water Pollution Prevention Plan

C-4 – OCSP (PLEASE SPELL OUT)

C-5 – Execution Plan

APPENDIX H

ESSENTIAL FISH HABITAT ASSESSMENT

APPENDIX G

**MARINE BIOLOGICAL SURVEY
OF THE
POINT ARGUELLO BOATHOUSE**

APPENDIX D

**APPENDIX S OF THE SEIS
CLEAN AIR ACT CONFORMITY APPLICABILITY
ANALYSIS FOR VANDENBERG AFB**

APPENDIX F

**TABLE 3.14-2 FROM THE FEIS:
THREATENED, ENDANGERED, AND CANDIDATE
SPECIES OCCURRING OR POTENTIALLY OCCURING
AT VANDENBERG AFB, CALIFORNIA**

APPENDIX E

**TABLE G-2 OF APPENDIX G
FROM THE FEIS: BIOLOGICAL RESOURCES**

APPENDIX I

CULTURAL RESOURCES

(Confidential: Not For Public Distribution)
